The IRON AGE

March 26, 1959

A Chilton Publication

The National Metalworking Weekly



Welding Show Feature:

How to Select
Power Sources For
Welding P. 14:

Rails Map Plans To Meet Seaway Rates – P. 93

Why Steel Earnings Held Up in '58 Slump - P. 102

Digest of the Week - P. 2-3



COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION

4001 Mahoning Avenue • WARREN, OHIO
EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.



Huge shaft to help make power hum

This forged generator shaft is a giant that will do a giant's work. At one of the great Northwestern dams it will take its place in the hydroelectric plant.

The big forging weighs 95 tons, is more than 33 ft long, and has a $15\frac{1}{2}$ -in. bore throughout its entire length. Made of carbon-vanadium steel, it was carefully heat-treated to produce the desired mechanical properties.

Huge shafts like this, and other high-tonnage items, are no strangers to the Bethlehem forge and machine shops. Yet Bethlehem forged products are not always king-size. We are equipped to handle all weights and shapes, from the real giants of the family to midget drop forgings.

Call us whenever we can be of service. No matter how complex your designs, Bethlehem technicians will meet all specifications. When Bethlehem does the job, you can be doubly sure of its quality.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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BETHLEHEM STEEL



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THE ISON AGE, published every Thursday
by CHILTON COMPANY, Chestnut & 56th
Sts., Philadelphia 39, Fa. Second class
postage paid at Philadelphia, Pa. Price
to the metalworking industries only or to
people actively engaged therein, \$5 for 1
year, \$8 for 2 years in the United States,
its territories and Canada. All others \$15
for 1 year; other Western Hemisphere
countries, \$35; other Foreian Countries,
countries, \$25,00. Cable 50.

Philadelphia,
Philadelphia.

The RONAGE

March 26, 1959-Vol. 183, No. 13

Digest of the Week in

*Starred items are digested at right.

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NEWS ARTICLES

SEAWAY COMPETITION

Will Cut Rail Rates—Railroads serving East Coast ports are moving to meet challenge of St.



Lawrence Seaway even before it opens next month. Export coal and grain, imported ores are most important products involved. P. 93

STEEL LABOR

McDonald Sounds Off - Steel labor chief is worried mostly about continuing unemployment despite better steel business. He reiterates "no contract-no work" policy of the union but refuses to rule out the possibility of a contract extension P. 96 beyond the deadline.

VENEZUELAN REPORT

Tough but Fair-Under its new president, Venezuela will be tough but fair to U. S. business. A special on-the-scene report by Tom Camp-P. 98

CENSORSHIP PROBE

House Is Suspicious - Suppression of news stacks up as a

Metalworking



BUYING WELDING POWER:

Talking over welding-power sources at Airco's Central Research Laboratories are W. J. Greene, Assoc. Director of Metallurgical Research, C. A. McClean, Process Engineer, and G. R. Rothschild, Asst. Director of Metallurgical Research.

P. 143

major blot on the Eisenhower Administration record. Does military scream "security" to hide blunders? P. 121

INVESTMENT DECISIONS

New Formula—A new system for helping management decide which investment is the best is suggested by George Terborgh, research director, for MAPI. P. 125

WELDING FEATURES

WELDING-POWER SOURCE

Which to Buy—An eight-step method can help you decide which welding-power source is best for a given job. Factors range from the location of the welding operation and type of welding current and duty cycle down to shop power supply voltage. Each type of power source can be studied in the light of these requirements.

P. 143

TAPE AIDS ARC WELDING

In Automated Precision—Punched tape takes over control of spot welding of critical missile fins. The four-torch setup fills the need for welding joints blind on one side. Pilot-arc starting insures positive starting of the main arc. Builtin flexibility will enable setup to cope with future designs. P. 151

CONTROL RESISTANCE WELD

In Complex Assembly—A numerical control unit guides a spot welder through a complex welding

sequence with automatic positioning. Fast makeup of coded paper tape makes changes easy. P. 154

ELECTRON-BEAM WELDING

Uses a Vacuum—A new approach produces high-purity welds in joining some of today's exotic materials. The method gets excellent fusion zone geometry. Initial work has been mostly on highly reactive metals.

P. 156

WELDING SHOW PROGRAM

Including Exhibitors—The listing of the program of AWS and AIEE technical sessions will be a good reference for the coming Welding Show. Exhibitors are listed too.

P. 176

MARKETS & PRICES

LAKES ORE CARRIERS

Set for a Rush—In a few weeks, ore ships on the Great Lakes will be making knots to beat the steel strike deadline. A strike, and the late thaw, may cut the shipping season short.

P. 97

FARM EQUIPMENT

Sales Better — Near the end of last year the industry predicted little change in 1959. Now, their third revision says business will be about 15 pct better. P. 100

SMALL CAR ENGINES

Front or Rear?—A controversial engineering question is developing over small cars which the Big 3 will introduce next fall. Is best engine location in front or rear? P. 117

BIG STEEL DRIVE

Critical Second Quarter — The mills are getting set for a fast-and-furious second quarter. There's a good chance that second quarter output and deliveries will set all-time record.

P. 185

ADHESIVES PRICES

Due for Boost—If you're buying adhesives based on rubber, synthetic rubber, or synthetic resins you can expect price increases soon. But volume production has brought epoxy price cuts. P. 186

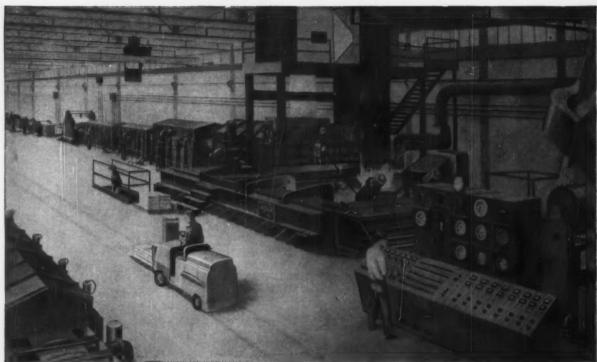
NEXT WEEK

PRODUCT DEVELOPMENT

In Job-Lot Production—When each customer requires different variations, product development can run into snags. Next week's technical feature tells how one company does the job by integrating marketing, design and production.

APPROPRIATIONS SURVEY

For Metalworking—A report on the funds actually appropriated by metalworking industries in the fourth quarter, 1958, will appear in next week's issue. It will help management pinpoint trends and gage the course of its markets.



The above is a partial view of the two continuous galvanizing lines at the Martins Ferry, Ohio, plant of WHEELING STEEL CORPORATION.

Both lines use AJAX 60 cycle induction galvanizing furnaces and zinc premelt furnaces. The main galvanizing furnace shown holds

175 tons of zinc, is rated 2000 kw, and produces over 40 tons per hour at speeds in excess of 300 feet per minute. These continuous galvanizing lines produce WHEELING's patented SOFTITE sheet.

60 Cycle induction galvanizing

has progressed from small beginnings a few years ago to a

present capacity of well over one million tons per year.

Here is an entirely new approach to an old art:

A refractory lined hearth in place of the iron kettle eliminates kettle replacement and iron pickup, drastically reduces dross formation.

Temperature control is precise, lag free, holds the melt at ideal galvanizing temperature at all times.

Gentle electromagnetic circulation facilitates alloy additions, keeps alloy uniform throughout the melt.

Clean and cool working conditions for hand dipping or continuous operations.

All these factors help to produce a galvanized coating of consistent superior quality and to attain high production at lowest unit costs.

MAY WE HAVE YOUR INQUIRY?



ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

60 CYCLE INDUCTION MELTING

Associated Companies:

Ajax Electrothermic Corporation

Ajax Electric Company

hot strip rolling on MORGOIL BEARINGS

MORGOILS were first installed in 1947 on only four stands of the hot strip mill at Weitron Steel Company, a Division of National Steel Corporation. Other backup roll bearings have been discarded and all eleven stands of the rebuilt mill are now rolling high quality strip on MORGOILS.

MORGAN CONSTRUCTION CO., WORCESTER, MASSACHUSETTS

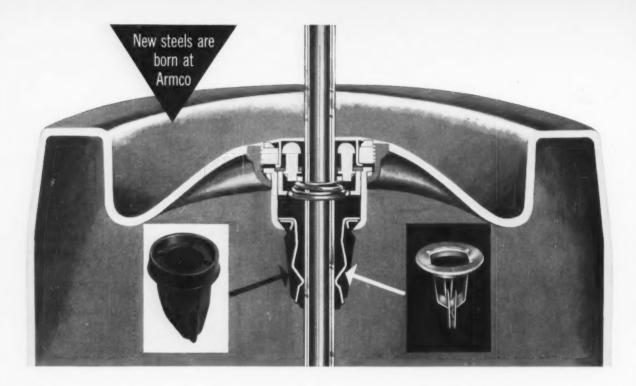
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1959

ROLLING MILLS . MORGOIL BEARINGS . GAS PRODUCERS WIRE MILLS . EJECTORS . REGENERATIVE FURNACE CONTROL

Pe 11



How Seal Spring of Special Armco Stainless Helps Keep Draft Beer Fresh

An unrelenting "squeeze" from a spring clamp made of special Armco 17-7 PH Stainless Steel helps this new beer keg seal maintain a leak-proof barricade against contamination.

The 17-7 PH spring is the "muscle" inside a molded rubber sealing unit that keeps a pressure-tight grip on the tap rod from the moment it's inserted. When the rod is removed, the spring snaps the seal shut. Thus draft beer is protected from air and contaminants throughout tapping and dispensing. And the same keg seal can be used time and again.

Many materials were tested by the designers of this unique tapping system—Champion Safe Tap Company, Cleveland, Ohio. Armco 17-7 PH Stainless was selected for the vital spring clamp because of its excellent spring properties and great resistance to relaxation despite repeated flexings.

Need corrosion-resisting springs?

Corrosion resistance is another top advantage of precipi-

tation-hardening Armco 17-7 PH Stainless. This, combined with its strength and ease of fabrication, accounts for the growing use of this special grade for exacting spring applications.

Why not consider it for spring parts in *your* products? Armco 17-7 PH is produced in sheet, strip, plate, billets, bar and wire. For more information, fill in and mail the coupon.

Armco Steel Corporation 1529 Curtis Street, Midd	letown, Ol	hio			
Please send more informatio	n about Ar	mco :	17-7	PH	Stainless
Steel, We make					
Name		Ti	tle_		
Firm					
Street					
City	Zone	St	ate_		

ARMCO STEEL



Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

We Must Avoid a Trap If We Are To Avoid Chaos

The President has spoken. We will not budge an inch in Berlin if it means sacrificing our friends —and our solemn commitments.

We go before the world as truthful people. We are not greedy. We are not trying to gain territory—or force our beliefs on others. All we want is peace and a living up to honest and honorable intentions.

These words are not mere platitudes. They are not naive statements which the Soviets will brand as propaganda. What we believe in as a people is carved in our history. It is there for all to see—our enemies should know and we should not have to prove it to our allies.

But these are troubled times. Our enemies—and can we call the Soviets anything else—are not interested in seeing our allies believe in and have trust in us. They want the opposite. The President and his advisers know this well.

We must stay strong. While we refuse to let Mr. Khrushchev get the idea that we are saps and weaklings, we must speak and work for peace. There is no other way out. At the same time we have the awful duty to refuse to give the impression that we will bow to threat, intimidation,

and international chicanery - or blackmail.

There is no doubt at all that the Soviet leaders want world domination. Nor is it unclear that they are building the power to make this come true. We know that they have broken all pledges and promises to the contrary in the past.

We know, too, that many in our land are exercising their freedom of speech by suggesting that we should treat the Reds with more understanding. It is said that this is a worldly fact: The Reds are here, we must compromise with them.

That is the talk of those who fail in some way to see the truth. Once the Reds get an idea that we are uncertain, weak-kneed and ready to abandon downtrodden people, the whole free world will go down to destruction.

We must be willing to talk, strong as strong can be, peace loving; courageous enough to back our beliefs with death. We must exhaust all avenues to peacefully prevent aggression.

That is our awful responsibility. And it needs the complete understanding and cooperation of every American in the land. Only thus will Mr. Eisenhower have the support he needs.

Tom Campbell

Editor-in-Chief



Sheet and strip—more than 20 kinds and Ryerson delivers fast!

You name it-Ryerson has it.

Hot and cold rolled sheets. Pickled and oiled sheets. Tight-coated galvanized and galvannealed sheets that won't flake or peel when you form them. Stainless sheets. Ryex expanded metal. Perforated sheets. And many others, all in a wide range of gauges and pattern sizes.

Need special sizes? Modern equipment cuts them

to your specifications quickly and economically, in blanks, straight lengths or coils.

Ryerson also offers a complete line of metalworking machinery and tools to meet virtually every requirement.

When you want sheet and strip, give Ryerson a call—it pays!

 $I \cdot V \cdot B \cdot M$

Increased Value in Buying Metals
Ask about this Ryerson Plan for 1959



RYERSON STEEL

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Principal Products: Carbon, alloy and stainless steel — bars, structurals, plates, sheets, tubing — aluminum, industrial plattics, metalworking machinery, etc.

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BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · DALLAS · HOUSTON · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

Welding Tool-Steel Sheets

Tool steel sheets, 0.005-in. thick, are being butt-welded for solid-fuel rocket engine casings. Some sheets, clamped in place, go through welding automatically. Other sheets are electrically preheated locally to 600°F and welded under inert gas. The whole sheet used to be oven heated and then welded rapidly before temperature dropped. Only 0.001-in. reinforcement is allowed because sheets cannot be ground.

Collapsible Tanks for Space

New methods of carrying liquid fuels in missiles and rockets should interest metalworkers. Metallic bags are being used in some systems to solve the problem of sloshing in tanks as the fuel is burned. At least one missile already uses flexible aluminum bags to carry fuel for its guidance rockets. The fairly small tanks collapse as fuel is used. Scientists want a similar system for main fuel storage.

Blast Furnace Gas Seal

Used to seal the shell of a blast furnace against gas leakage, a new material allows greater pressure in the working area of the furnace. It's a self-setting plastic compound that is completely insoluble and will last for an entire furnace campaign. It has also been used for patching water, steam, acid and chemical lines.

Ear Plugs Shut out Shock

In the form of a pair of polystyrene plugs, a new noise controller protects the wearer from shock noises and yet allows him to hear all normal conversation. The device does not enter the ear canal, but twists easily into position for comfortable wearing. It's a way to eliminate the fatigue so often brought about by high noise levels.

Cleaning Methods for Steel

A recent report contains a survey of typical cleaning methods for removing surface contaminants from corrosion-resistant steels. It discusses the removal of scale, flux, slag, metallic lubricant and iron from the surface of such AISI types as 200, 300 and 400 series. According to the report, the rate of attack by nitric acid passivating solutions in the absence of heat-treat damage is low, compared to the rate by nitric-hydrofluoric acid pickling solutions.

Simple Tape Controls Lathe

Since the tape used in a turret lathe setup is not numerical or digital, no mathematical computations are involved in tape preparation. There's no need for a computer. Following a coded program chart, a clerk can punch a tape using a compact tape preparation unit with easily set dials and clearly marked push buttons.

Ways to Cut Tooling Costs

New materials and methods are cutting die costs in automotive and supplier plants. A recent SAE meeting heard that forming, stamping and forging dies can now be cast to tighter tolerances. New plastics and soft metals developments help. Electronic machining and numerical control look like sure bets in long range.

For Temporary Protection

Just announced is a removable scratch-resistant coating for temporary protection of aluminum, magnesium and stainless steel in transit and during fabrication. Applied by spray or roller, the low-cost coating air dries in 5 minutes to 80 Rc, yet is easily removed with warm water rinse. While it's opaque, the coating allows essential markings to show through.

Question Plant Relocation

Plant relocation to overcome high labor costs is not always the answer. Numerous cases reported at a recent engineering society meeting, show that union representation moves with the company. Any regional wage differential soon disappears. A vital factor in lowering costs often ignored is productive efficiency per foot of floor space. Automation could boost this in many plants outside the automotive field, experts reported.

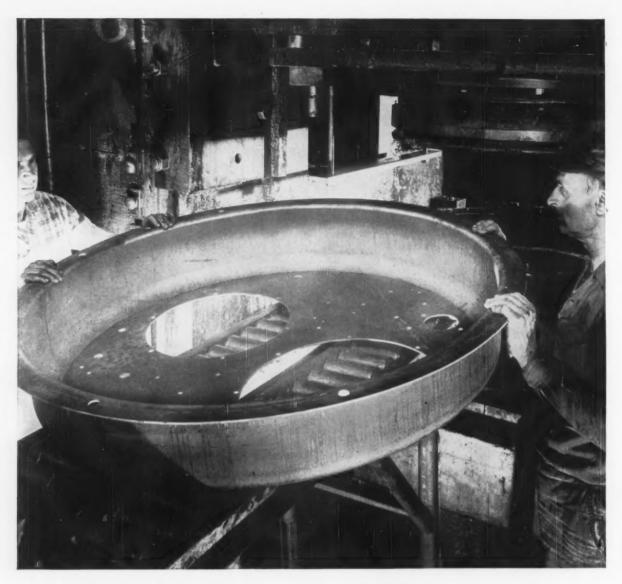
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959



Just saved: 61 separate drilling operations

Dimensions and placement of everyone of the 63 holes in this Cleaver Brooks boiler door must be right on the nose. Tolerances of the dished stamping—plus or minus $\frac{1}{16}$ on both the 60" diameter and flatness across the flange—must be held even *after* the holes are pierced.

COMMERCIAL meets all of these exacting requirements. It designed and turned out the forming and piercing dies, forms the heavy stampings and gang pierces the holes. And it's the same story all the way with the 36" and 48" diameter dished boiler doors COMMERCIAL also manufactures for Cleaver Brooks,

Only the first gang-pierced boiler door requires a tolerance inspection. After that, as in the case of the 60" diameter stamped door, it's 63 holes at one crack—all with identical, near-perfect size and location tolerances every time. And at no time do the actual

stampings go beyond the limits of their specified plus or minus $\frac{1}{16}$ rolerances.

Here's the kind of accurate, cost-saving metal forming service you may want to consider the next time you're in the market for a medium or heavy stamping—long or short run. Just send along a blueprint or complete information on your requirements. Our engineers will cooperate fully. Address Commercial Shearing & Stamping Company, Department K-13, Youngstown 1, Ohio.

GOMMERGIAL SHEARING & STAMPING

Taxes and Wages

Sir—Hats off to the editorial (Tax Payers' Revolt) and the lead article (Steel Labor and Management Court the Public) in the Feb. 19 issue.

As you note, the taxpayers' revolt is bound to come, and it seems to me there are some rumblings starting already. However, it needs all the help and encouragement it can get. Time is of the essence as the free spenders are liable to make such a shambles a revolt will have little to work with.

Regarding the coming campaign pro and con the steel wage situation, management again certainly has its work cut out for it. We can only hope that they will take a strong and positive approach to give the American people the true facts of the situation.

Keep up the good work. I believe the people in general are starting to awake.—R. D. Oldfield, Jr., Stoney Ridge Rd., North Ridgeville, O.

Maintenance Costs

Sir—In your issue of Feb. 12 you published an excellent article titled "Why Contract Maintenance Is Growing" and "Look Out for Maintenance Costs."

Our business is industrial electronic installation service and we are attempting to expand into contract maintenance.

This article, we feel, would be a very strong aid in increasing our business if we would be permitted to enclose a copy with our promotional letters.

Would it be possible to obtain fifty reprints or get permission to reproduce the article.—D. T. Hindman, General Mgr., Custom Electronics Co., Kenmore, N. Y.

Mission Accomplished

Sir—Last October I asked if you knew of anyone who might be interested in some old Buck's Stove and Range Co. catalogs. You published my letter in your Nov. 6 issue.

Mr. R. P. Guildford, Atlantic Region Service Manager of Westinghouse, saw it and wrote me. He now has two of the catalogs, and the Original Country Store in Weston, Vermont has one. The Henry Ford Museum at Dearborn, Mich. has requested the remainder.

We are delighted to have been able to place these catalogs where they will be appreciated. We do appreciate your help in bringing this about.—Avetta Danford, Pres., The Buck's Stove and Range Co., San Francisco.

Patent Review

Sir—We welcome the monthly IRON AGE feature—"New Patents." We consider it of great value to the busy subscriber.—D. J. McCarty, Librarian, Federal-Mogul Div., Federal-Mogul-Bower Bearings, Inc., Ann Arbor, Mich.



"Benson, I'd like a word with you!"



Herbert W. Westeren,

Asst. Director of Hayes Research & Development Group, Reports . . .

PRODUCTION HEAT TREATING BREAKS THE 3000°F. BARRIER

Today's "exotic" refractory metals for nuclear reactors, rocket engines, and electronic components call for heat treating temperatures of 3000°F. plus... temperatures heretofore limited to the laboratory.

Vacuum is often the answer. In keeping with our leadership in the vacuum field, our group



field, our group developed a high temperature, high vacuum furnace for sintering, annealing, and firing operations. This versatile modification of the well-received Hayes VacuMaster®

features changes in valving, power requirements, and low voltage heating elements to extend temperatures into the 4500°F plus range. Scaled for full production, Model HT/HV affords advantages of rapid cycling, saturable reactor control, cold wall construction, and vacuum to 0.1 micron.

Atmosphere furnaces are needed,



too. For processing with nonoxidizing atmospheres, our group also developed the M-Y Moly Element Furnace. Uses of this 3300°F unit: reducing tungsten and silicon, ceramic metal-

lizing, and other ultra-high temp. work. Also in design is an oxidizing and reducing atmosphere electric furnace for the 3500°F range.

These new Hayes furneces, developed under actual production conditions in our lab, are now serving industry on high temp. jobs perhaps similar to your own. Vacuum Furnace

Vacuum Furnace
Bulletin 5709A
and M-Y Furnace Bulletin
5805 give details. Write for copies.



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"It Pays To See Hayes" for metallurgical guidance, laboratory facilities, furnaces, atmosphere generators, gas and fluid dryes.











Take a cost-wise look at your assembly operations,











and you'll see that fasteners











represent real money. To make sure











it is money saved-not lost-











count on Continental

MORE TYPES OF FASTENERS Continental Assembly Specialists are unbiased toward any particular types . . . Continental makes all types. The fastener they recommend for your job is the one proved best by careful cost analysis.

MORE STANDARDS IN STOCK Continental can supply any recognized standard type, style or size. Also, many fasteners ordinarily considered "specials" are available among the millions of screws constantly in stock to meet needs of Continental customers.

MORE "SPECIAL" EXPERIENCE Continental is known throughout industry as the "specialist in specials," — leads in production of special designs. Continental is also your supply

source for special-purpose fasteners, such as HOLTITE NYLOK Self-locking Screws.

MORE "SPECIAL" PRODUCTION FACILITIES With Continental's modern, precision controlled equipment, many special shaped screws formerly machined from bar stock can be produced faster, at lower cost — with higher tensile strength and excellent surface quality.

Let Continental Assembly Specialists analyze your operations and help you find cost-saving opportunities that are often overlooked. You'll see why fastener users everywhere agree, "You can count on Continental." Write or phone: Continental Screw Co., 450 Mt. Pleasant St., New Bedford, Massachusetts.

CONTINENTAL

SCREW COMPANY, NEW BEDFORD, MASS.

HOLTITE FASTENERS

HY-PRO TOOL COMPANY . . . DIVISION RESEARCH ENG. & MFG., INC. SUBSIDIARY



HOLTITE PHILLIPS
AND SLOTTED HEAD
WOOD • MACHINE • TAPPING
THREAD FORMING •
SEMS • NYLOK
HY-PRO PHILLIPS
INSERT BITS AND HOLDERS

Big Job

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In this week's issue (opposite page 104), you see the results of a monumental job done each year at this time by George McManus, our Pittsburgh district editor. It's The IRON AGE Financial Analysis of the Steel Industry.

This report is loaded with information on 29 steel companies representing more than 92 pct of the steel ingot capacity in the industry. Each year we receive hundreds of requests for extra copies of this valuable report on steel. A good thing to keep handy in that upper left hand desk drawer when the boss calls for information on steel finances and operations.

Another Viewpoint

Recently we ran an item commenting, tongue-in-cheek, about the army's method of getting the right man in the right job. Briefly it was this:

Bright and busy types: Make them line officers.

Bright and lazy types: Make them staff officers.

Stupid and lazy types: Let them find their own level.

Stupid and busy types: Reassign them before they wreck the division.

Now comes word from D. A. Schmidt of the American Steel Foundries, that the German army has just the opposite viewpoint. As proof he quotes from an AMA Management Report — "Planning Ahead for Profits" as follows:

"A top German general once said that there were four qualities to be found in the German officer, and that every officer had two of them —he was either industrious or lazy, and either intelligent or stupid.

He described the best line officer, on the one hand, as being intel-

ligent and lazy. He could size up a problem, but was always trying to organize himself out of the work, and, for this reason, was happy to delegate.

The best staff officer, on the other hand, was intelligent and industrious. He did not make a good line officer because his industry urged him to do too much work himself.

The general went on to say there was always a place for the stupid and lazy officer. He could be assigned to guard duty or something of that sort. He warned, however, that the man who is industrious and stupid can cause a lot of trouble.

Mr. Schmidt adds, "We are inclined to agree with the AMA version." Maybe so, Mr. S., maybe so. All we know is our experience during World War II when the U. S. Army seemed to assign accountants to ordnance and engineers to the infantry.

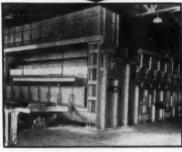
For the Record

In addition to the general credit to various adhesives manufacturers, including Armstrong Cork Co., which appeared at the end of the 16-page "Adhesives Dollar" article in our March 5 issue, a special credit and an apology are due.

The material on pages 88-90 on the "Adhesives Dollar" article was excerpted from "Industrial Adhesives," a technical manual recently published by Armstrong Cork Co. Due to an error, this was not so stated in the article.

The 63-page Armstrong manual is an authoritative handbook on industrial adhesives. The complete manual is available from Armstrong Cork Co., Lancaster, Pa. at \$2 a copy.





R-S CAST IRON PIPE ANNEALING FURNACES USED BY EVERY LEADING PIPE FOUNDRY

For more than 35 years leading producers of centrifugal cast iron pipe have relied on chain conveyor type annealing furnaces designed and built by R-S.

R-S experience goes back to the first centrifugal cast iron pipe produced in this country more than 35 years ago. Since then cast iron pipe annealing furnaces have been a specialty with R-S engineers. Their experience and development of furnaces to meet the needs of annealing cast iron pipe has kept pace with the industry. Today, R-S pipe annealing furnaces offer greater uniformity of heating through all ranges and precision controlled cooling.

R-S pipe annealing furnaces range in capacities from 15 to 35 tons per hour. Write for complete information on the newest developments in centrifugal cast iron pipe annealing by R-S.

R-S FURNACE COMPANY, INC.
NORTH WALES, PA.





The refractory aluminum can't lick!

... CRYSTOLON* Silicon Carbide

Impact on a charging hearth...a surge of molten metal into a trough...attack by corrosive alloys, fluxes and slags...
Norton CRYSTOLON Refractories stand up to all these rigors of aluminum melting and transfer operations. Their exceptional stamina and stability not only protect purity throughout critical processing but also sharply reduce refractory maintenance.

Small wonder. CRYSTOLON Refractories are the most resistant to corrosion and erosion of all known refractories — and they offer outstanding mechanical strength and the highest resistance to thermal shock.

Ideal for use at all key melting, holding and transfer points, CRYSTOLON Refractories are specifically recommended for reverberatory and induction type furnaces. On the melting hearth, in the hot wall, in the holding hearth, and in many other critical areas, they assure longer refractory life . . . cleaner metal, free from refractory inclusions. What's more, CRYSTOLON Refractories are not wet under these corrosive conditions. Refractory surfaces stay clean longer . . . last longer.

Use these versatile refractories wherever aluminum could cause costly trouble . . . wherever contamination is a threat: in

melting areas, launders, spouts and simple valves... for tap blocks and stopper rods. Take full advantage of today's high purity pig... protect purity during your operations. Reduce your reject losses with Norton CRYSTOLON Refractories. Several types are available to meet your precise requirements: oxide-bonded CRYSTOLON "G"; nitride-bonded CRYSTOLON "N" and recrystallized CRYSTOLON "R" Silicon Carbide. For complete details, write NORTON COMPANY, Refractories Division, 202 New Bond Street, Worcester 6, Mass.

NORTON PRODUCTS

Abrasives • Grinding Wheels • Grinding Machines Refractories • Electrochemicals

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



Engineered ... R ... Prescribed

Making better products . . . to make your products better

COMING EXHIBITS

1959 Nuclear Congress—Apr. 5-9, Cleveland Auditorium, Cleveland. (Engineers Joint Council, 29 W. 39th St., New York 18.)

Welding Show—Apr. 6-10, International Amphitheatre, Chicago. (American Welding Society, 33 W. 39th St., New York.)

Engineered Castings Show — Apr. 13-17, Sherman and Morrison Hotels, Chicago. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Packaging Exposition—Apr. 13-17, International Amphitheatre, Chicago. (American Management Assn., 1515 Broadway, N. Y.)

Powder Metallurgy Show — Apr. 20-22, Sheraton - Cadillac Hotel, Detroit. (Metal Powder Industries Federation, 130 W. 42nd St., New York 36.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show — June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Finishing Show — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. Mc-Aleer, 3171 Bellevue, Detroit 7, Mich.)

MEETINGS

APRIL

Gas Appliance Manufacturers Assn.
—Annual meeting, Apr. 1-3, Americana Hotel, Bal Harbour, Fla. Association headquarters, 60 E. 42nd St., New York.

Specific measures to resist Russian economic aggression will be discussed by top national business and military leaders at the Fifth Na-(Continued on P. 16)

Now! FULL-POWER Fire Fighting with this complete dry chemical line!



Kidde top-rated portables and wheeled units kill more fire...faster!

From the powerful new 2½-pound portable, on up to the giant 200-pound wheeled unit, Kidde dry chemical extinguishers pack the *extra* punch needed for stubborn blazes, for *full-power* fire fighting. Available in pressurized 2½, 5, 10, 20 and 30-pound capacities, Kidde dry chemical portables feature simple, one-two operation, are easiest of all portables to operate, even while wearing gloves. Kidde portables have no valves to turn, no pins to pull, need no bumping or inverting. Just aim, pull trigger, and fire's out! All are quickly and easily pressurized, have dust- and moisture-proof gauges which show at a glance when unit is charged.

The 200-pound Kidde pressurized wheeled unit discharges a 40-foot dry chemical stream faster, has an *extra* 50 pounds of fire-smothering dry chemical to knock down fire quicker. It's faster and easier to operate... just remove pin, swing toggle lever, and flip on-off lever. Easy to maneuver because of its low center of gravity and larger wheels. Truly a one-man fire engine!

All Kidde extinguishers are granted top rating by Underwriters' Laboratories, are the finest extinguishers on the market today. Get more information about this *complete* line of *full-power* fire fighting equipment. Write to Kidde today!



Walter Kidde & Company, Inc. 349 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd.

Montreal — Toronto — Vancouver

959



How many hours have you spent in digging for the right cleaning method for some newly-encountered metal or soil?

To answer your needs, Magnus has prepared this new, easy-to-read, easy-to-file folder — a complete chart-guide to picking the right method, chemical and solution for all commonly-encountered soils and surfaces.

EXHIBITS, MEETINGS (Continued from P. 15)

tional Military - Industrial Conference meeting at the Palmer House, Chicago, April 6-8. Conference headquarters are at 140 S. Dearborn, Chicago 3.

National Assn. of Waste Material Dealers, Inc.—Annual convention, Apr. 6-8, Edgewater Beach Hotel, Chicago. Association headquarters, 271 Madison Ave., New York.

Building Research Institute — Annual meeting, Apr. 6-8, Penn Sheraton Hotel, Pittsburgh. Institute headquarters, 2101 Constitution Ave., Washington 25, D. C.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Apr. 7-8, Empress Hotel, Miami Beach, Fla. Association headquarters, 1806 First National Bank Bldg., Pittsburgh.

National Assn. of Architectural Metal Mfrs.—Annual convention, Apr. 12-17, Hotel Monteleone, New Orleans, La. Association headquarters, 228 N. LaSalle St., Chicago.

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 14-16, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.

National Petroleum Assn.—Semiannual meeting, Apr. 15-17, Cleveland Hotel, Cleveland. Association headquarters, Munsey Bldg., Rm. 958, Washington 4, D. C.

Association of Roller & Silent Chain Manufacturers — Spring meeting, Apr. 16-17, Drake Hotel, Chicago. Association headquarters, 3343 Central Ave., Indianapolis.

American Institute of Steel Construction, Inc.—National engineering conference, Apr. 16-17, The Dinkler - Tutwiler Hotel, Birmingham, Ala. Institute headquarters, 101 Park Ave., New York.



Continuous "torture" seam from Bethcon sheet

In fabricating spiral conduit, Carrier Corporation puts our Bethcon continuously galvanized sheet through a torture which can be survived only by steel sheet of the finest working quality.

As the coiled ribbon of steel is fed through the forming rolls of the spiral conduit machine, each edge is bent back, interlocked with the edge of the preceding convolution, and pressed flat. The resulting seam _____ is airtight, helps make the duct rigid, and provides a smooth interior surface.



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959

This seaming process requires a precision of bends and angles which demands a high degree of uniformity in the sheets. No cracking of the galvanized coating can be tolerated. Bethcon meets these requirements for Carrier—and it can meet yours as well. For full details, phone or write the nearest Bethlehem sales office.

Bethlehem engineers will help you with your steelworking problems



Stanley Tool's "Jobmaster" ball peins begin as hot-rolled 1 ¼-in. square bars of Bethlehem C1078 forging-quality steel. After drop-forging, they are annealed, drilled, ground, polished, and stamped. Prior to polishing, a series of heat-treatment operations is performed to procure a properly heat-treated tool: the rim of its striking face is induction-tempered to minimize chipping. Result: quality hammers, made from top-quality Bethlehem Steel bars.



Carbon bar flats become garden rakes—and not an ounce of Bethlehem C1060 steel is wasted. True Temper works each 22-in. length of hot-rolled 4 ½-in. by ¾-in. flat into two rake heads, complete with teeth and bows. The series of deft operations include blanking, roll-forgings, hot-bendings, grinding, press-forging, and tempering—a lot of processing for one piece of steel. Only quality steel, like Bethlehem carbon bars, will do the job.



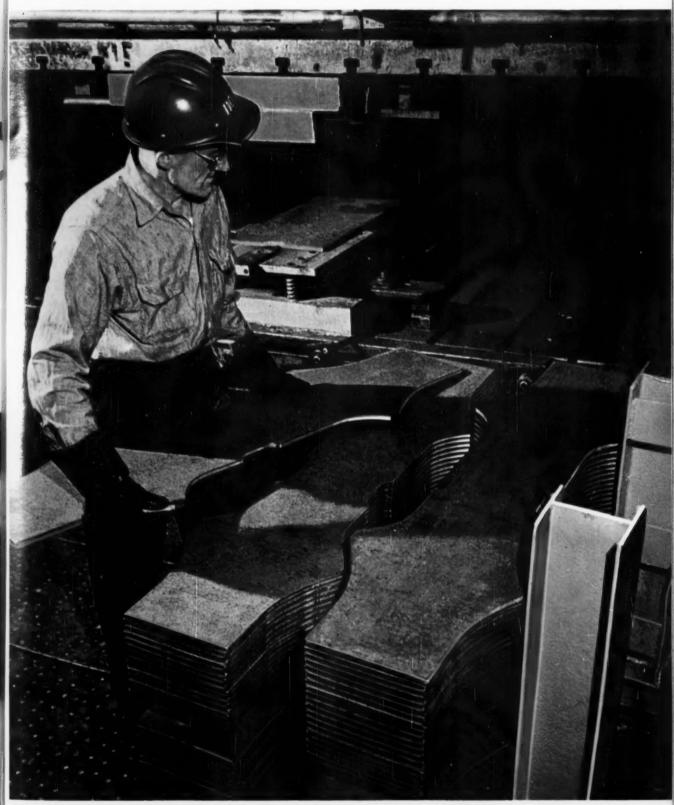


The first press-forging doesn't look much like a spading fork, but that's the first step at Union Fork & Hoe. The pattern shown is forged from a hot-rolled 4 $\frac{1}{4}$ -in. by $\frac{1}{2}$ -in. carbon bar of Bethlehem C1095 steel. Next, the "fingers" are rolled into a diamond-back shape, and the two outer tines are turned 180 degrees. After heal-treating, shot-peening, and polishing, the quality bar has become a quality garden tool, ready for heavy duty.



Cut Shapes Trim Costs — This blank will be formed and welded into a complete housing for a truck axle. The fabricator needs no cutting equipment. He'll have a minimum of scrap to handle—and to pay freight on. His job time will be cut to the bone.

Cut shapes save space, time, money. Our facilities allow us to make as wide a range of cut shapes as you'll find anywhere. We've been able to help many fabricators save money. One of our technical men will be glad to give you all the facts. Just give our nearest sales office a call.



BETHLEHEM STEEL

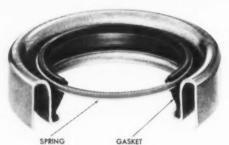
Sealing a shaft with coiled spring wire







The diminishing helix on one end threads into the other end to form a smooth, strong connection,



Simple type of oil seal

Here's a coiled spring which locks itself into a perfect circle. Its job: to provide 360 degrees of even pressure against a shaft gasket, preventing oil leakage.

For this oil seal retaining spring, Bethlehem spring wire consistently meets the all-important requirement of uniformity. It's just one of the many grades of spring wire which we regularly furnish.

We make just about every kind of steel wire. We draw it as fine as 40 ga and with any suitable wet- or dry-drawn finish. In special shapes, too, and for special purposes, such as cold-heading. We'll be glad to tell you more about Bethlehem wire. Just use the coupon below.

Bethlehem Steels and Specialties

Here is a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:

Carbon and alloy AISI grades Concrete reinforcing bars Leaded carbon and alloy steels Special rolled sections

TOOL STEELS:

A grade for every job FORGINGS: Drop, press, hammer, and upsetter Rolled-and-forged special

SHEETS: Hot- and cold-rolled Continuously galvanized

TIN MILL PRODUCTS: Electrolytic and hot-dip tin plate; black plate

PLATES: Universal and sheared

ROD AND WIRE: General and special-purpose types Fine and shaped wire

WIRE ROPE AND SLINGS

FASTENERS: Standard bolts, cap screws, rivets
Special fasteners

STEEL PIPE:

Continuous buttweld Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS: Frames, tanks, housings, vessels

RAILS: Tee, crane, girder

CASTINGS: Carbon, alloy, and stainless steel
Grey iron; brass and bronze

PUBLICATIONS DEPARTMENT BETHLEHEM STEEL CO., BETHLEHEM, PA.

Gentlemen: I would like additional information on

Name

A 4 days

City and State____

Address____

Folder 682

593, Printed in U.S.A

Bethlehem Steel Company, Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM STEEL



il seal

WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS

AEROGLIDE TRIMS WELDING COSTS 1/3 ... IMPROVES PRODUCT QUALITY



Structural parts are welded faster and easier with Jetweld.

Like many other manufacturers, Aeroglide Corporation of Raleigh, North Carolina, found themselves caught in a price-cost squeeze last

Aeroglide is one of the largest manufacturers of produce handling equipment and grain driers. All the equipment they build is welded and much of the welding is on sheet metal. Their biggest cost problem involved the sheet metal welds. Burn-through and spatter were eating up shop time and profits.



John Wyatt, Aeroglide's Shop Superintendent, "Our whole shop is more efficient because of improved welding methods."

John P.Wyatt, Jr., Aeroglide's shop superintendent and James F. Kelly, President, decided to seek outside help. They invited Kirk Sterling, a welding engineer with Lincoln's Charlotte, N.C. office to help them make a survey of Aeroglide's welding operations.

Working closely with Mr. Wyatt, Sterling made a careful analysis of their welding jobs. The burn-through and cleaning problems were solved with a switch to Fleetweld 37 electrodes which are specially designed for sheet metal welds. Greater production efficiency on heavier structural members was achieved with iron-powder Jetweld electrodes.

Mr. Sterling also conducted a five-day welding clinic which was voluntarily attended by Aeroglide's weldors and shop supervisors. Higher shop efficiency resulted from a better understanding of welding procedures as a result of the clinic.

The total effect—a 33% cut in welding costs.

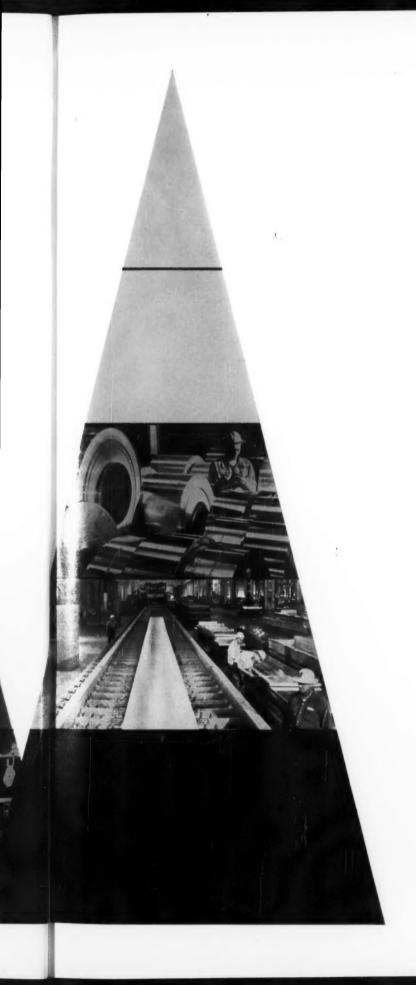
Jim Kelly, Aeroglide's youthful president, commented, "The Lincoln people have done us a great service. Big industries can go to their suppliers and demand the products they need. Companies like ours depend on our suppliers to show us how to get the most out of what's available. Lincoln has helped us build a better product... and made a stronger Lincoln customer.



Aeroglide grain dryers, easier to assemble, sturdier and more efficient with welded construction.

The LINCOLN ELECTRIC CO.

Dept. 1552, Cleveland 17, Ohio The World's Largest Manufacturer of Arc Welding Equipment § Symbol of New Standards of Quality and Service in the Aluminum Industry





Olin Aluminum hits a new high in quality and service

Olin Aluminum, the nation's newest major producer, has earned in two short years a key role as a basic supplier of metal in the automotive, construction, transportation and consumer durables fields.

Vast tonnages of sheet, coil, extrusions, rod, bar and casting alloys are now flowing into the top-quality lines of the country's leading manufacturers.

Olin Aluminum is fast gaining special recognition for the unusually high quality of its personalized service. Equally important, product quality is rigidly controlled from bauxite mining to your production line.

Our experienced staff of highly trained specialists welcomes the chance to give you individualized, detailed service. Call your nearby Olin Aluminum Sales Office or Authorized Distributor.

Metals Division, Olin Mathieson Chemical Corporation, 400 Park Avenue, New York 22, N. Y.



We make so many sizes... your "specials" could be our "standards"





We regularly produce all of the bearings shown here in a tremendous variety of bores, outside diameters, and widths.

outside diameters, and widths.

Take just the Tyson tapered roller bearing, for example. We make nearly 1,000 sizes of the single-row, straight bore type alone! Bore sizes range from five-eighths of an inch right up to a precise fourteen inches. And these figures don't include the many other sizes available in our double- and four-row types.

Yet they are all standard SCSF bearings, promptly available in large quantities at competitive prices.

So, why not get full details on the most complete line in the business? Any of our twenty-five sales offices can quote you facts and figures. Just call the one near you.





5921









5KF

Single-Row

Deep Groove Bearing

Spherical, Cylindrical, Ball, and Typon Tapered Roller Bearings

BKP INDUSTRIES, INC., PHILADELPHIA 32, PA.

REG. U. S. PAT. OFF.

IT'S A MATTER OF

pulling together!



GOOD/YEAR

And here's how Green Seal V-Belts by Goodyear make pulling together pay—and pay

On every type of drive—ievery part of Americant Green Seal by Goodyear are and outlast anything.

-AT AN OHIO CHEMICAL PLANT

Operation: Pulverizing nickel formate

Drive: Main drive on micro-atomizer — handles 20 h.p. at 5.868 f.p.m.

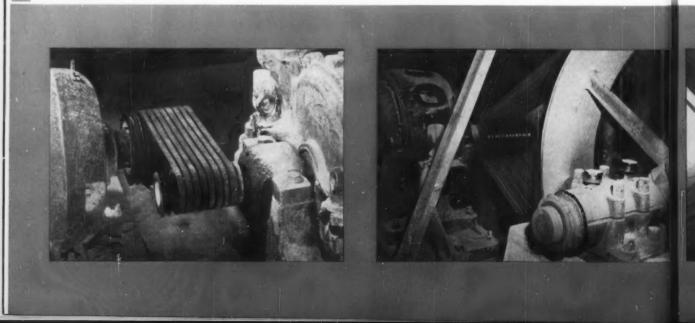
Service: Eight matched V-Belts with the Green Seal served for more than 6 months compared with 4-week life for 10 belts of another make.

- IN A MISSOURI PIPE PLANT

Operation: Making fire clay and sewer pipes

Drive: 125 h.p. ball-mill drive

Service: Fourteen matched V-Belts with Green Seal construction served 6 years without maintenance of any kind.



-ievery kind of industry—in camatched V-belts with the repulling together to outperform ng se belt-users can buy—

-ON A TEXAS OIL RIG

Operation: Drilling oil wells

Drive: Main drive on mud pump

conkind. Service: 20 V-Belts with the Green Seal pulled together to will 202,790 feet of hole — more than 25% better than the average belt-life in this service.

- AT A SOUTH CAROLINA FABRIC MILL

Operation: "Soaping" screen-printed fabrics

Drive: 50 h.p. "soaping" range drive with belt speed of 1,413 f.p.m.

Service: Ten matched V-Belts with Green Seal construction

served 8 years with virtually no time out.





Here's why

V-BELTS

with the

Green Seal

always pull together



The secret's their unequalled dimensional stability. And it's built into each belt via special tension members of steel cable or exclusive, synthetic Triple-Tempered (3-T) Cord. Then every set is precision-measured—several times over—to make sure they are perfect teammates.

That means matched sets really match. Every belt does its part of the job. There are no "loafers" to put extra strain on the other belts. No belt ever overworks and causes a premature failure. It's strictly a matter of *pulling together*—whether your drive calls for two or fifty belts.

What's more, every V-Belt with the Green Seal is designed to outperform all others. High in modulus, they're low in stretch to minimize take-up. They're friction-balanced — so covers don't stick or grab in the grooves. They're non-dusting, too.

In short, these are the belts that give you maximum, trouble-free hours at minimum cost. You need belts like these to pull together on your drives—large and small.

Just contact your Goodyear Distributor—or fill out the handy coupon below.

Green Seal-T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



DIMENSIONALLY STABLE V-BELTS WITH THE GREEN SEAL BY

GOODFYEAR

THE GREATEST NAME IN RUBBER

5-51162

THE GOODYEAR TIRE & RUBBER COMPANY, Industrial Products Division, Dept. 794, Akron 16, Ohio
Please send me more information about how V-Belts with the Green Seal solve the major problem in belting multiple V-Belt drives.

Name

City Zone State



... where industrial progress is cast in steel



APPLICATION ANALYSIS...AS YOU LIKE IT



Write for folder: How General Steel Castings Can Improve Product Design and Performance. General Steel Castings Station 201 Granite City, Illinois A thorough analysis of application and design problems is necessary for the development of optimum structural designs. Experienced personnel . . . sales, engineering and manufacturing . . . drawing from General Steel's more than 50 years of experience, are fully prepared to evaluate the structural requirements of your product. Their recommendations will enable you to build a better product, taking full advantage of the many benefits to be gained through the use of steel castings.

General Steel works from your specifications, or better still, starts from scratch to help you plan components of your products whether they be cast steel, cast-weld or composite structures. Our complete service . . . a unique blending of research and development, creative design, quality production and follow-through in the field . . . complements the initial application analysis.

Whatever your present or future plans, let us show you what steel castings . . . and General Steel . . . can do for you.

GENERAL STEEL CASTINGS

The hot peeling machine introduces a new principle in the ingot conditioning making possible these important advantages:



- Elimination of the cooling process after stripping with the consequent elimination of cracking dangers.
- Complete use of the stripping heat which is lost by conventional systems.
 This will result in the elimination of annealing treatment cost and of scrap dangers.
- 3) Substantial reduction in working time.
- Simplification of the whole operating cycle due to saving in material handling.



 Possibilities of performing a further peeling on the ingot face should a deeper conditioning be required.

- Improvement of the rolled products when obtained from hot peeled ingots.
- 7) Complete recovery of peeling chips. 8) Drastic reduction of costs and conside-
- rable improvement of the production.
 The conditioning cycle is automatic; a 61.
 ingot can be completely machined in 5
 minutes without operator's assistance.

A daily production of 1000 t. can be obtained.

The machine cost can be amortized in

The machine cost can be amortized in only one year considering the savings and the higher production.

Operation and maintenance are very simple. The hydraulic controls and the automatic operation of the equipment make possible a perfect performance.



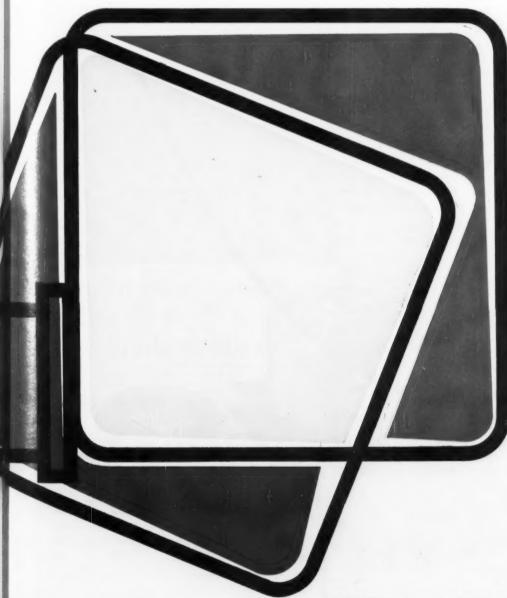




società generale per l'industria metallurgica e meccanica

works in milan (italy)





INNOCENTI CORPORATION . 45 Columbus Avenue
NEW YORK 23, N.Y. - Tel. Columbus 5 - 7795

WITH "BUFFALO" BENDING ROLLS

"Buffalo" Bending Rolls will cut costs, increase profits in your production bending operations because they're *fast*, *versatile*, *accurate*. Satisfied users report faster, higher quality output with fewer rejects.

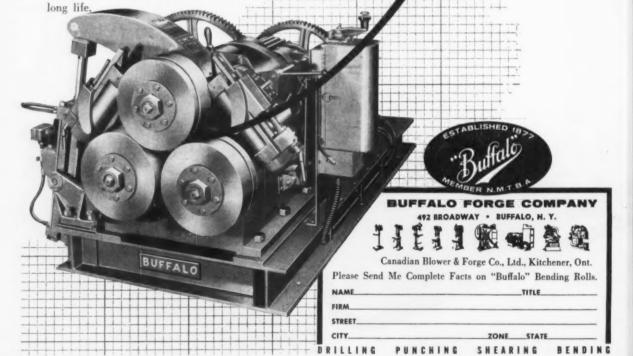
Hundreds of shops, large and small, use them for rapid bending of circles, segments and spirals. Angles, rounds, squares, tubes, beams, channels, flats and many special shapes are handled with ease. Quick, easy roll changing for different structural shapes and sizes. Valuable setup time is saved by the "Buffalo" hydraulic top roll adjustment. With this, the upper roll is easily positioned or released in seconds.

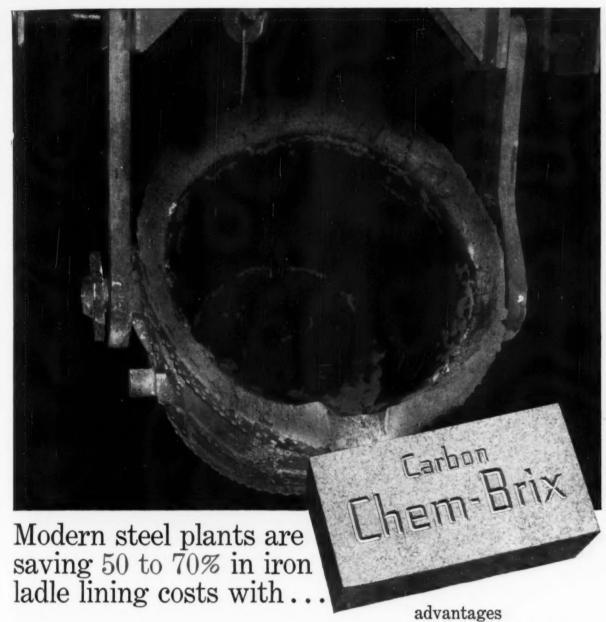
Helping to speed operations is the exclusive "Buffalo" "Leg-In"

Attachment. This simplifies bending of angles leg-in, formerly very difficult. Prevents material from twisting or getting out-of-square; also acts as a gauge when bending a run of circles to the same diameter.

"Buffalo" Bending Rolls are available in a number of sizes to handle all types of work, from small fabrication jobs to the heaviest applications. For full information, use coupon below — or call your "Buffalo" machine tool dealer.

All "Buffalo" Machine Tools bring you the extra "Q" Factor—the built-in QUALITY that provides trouble-free satisfaction and





Carbon CHEM-BRIX, after six years of service in steel plants, have gained the recognition as the most efficient and economical refractory for lining transfer and bessemer steel ladles, hot metal spouts, etc. Service comparison tests prove that CHEM-BRIX actually cost 50 to 75% less than regular fire clay brick. CHEM-BRIX provide you with a brick that offers 100% dimensional uniformity; provides a smooth, monolithic surface; "sheds" molten metal like oil sheds water; offers a unique self-cleaning property and simplifies skulling. Write today for complete information.

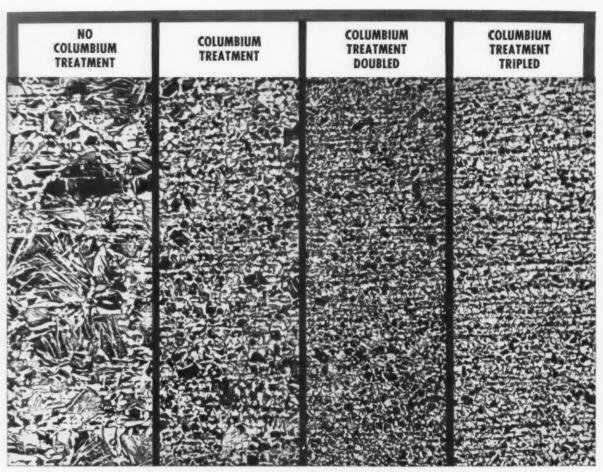
- Last 50 to 75% longer than fire clay brick.
- Produces a monolithic, self-cleaning surface.
- · Simplifies skulling.
- 100% size uniformity insures tight joints.

PRODUCTS CO.

Main Office—Barber Building, Joliet, Illinois
Sales Office—208 South LaSalle Street, Chicago 4, Illinois

MANUFACTURERS OF: GOOSE LAKE Ladle Brick, Ground Fire Clay, Fire Clay Flour; GRUNDITE Bond Clay; FIROX; THERM-O-FLAKE Insulation Coating, Brick, L.B. Block, Concrete; CHEM-BRIX, Silica, Carbon

HOW GREAT LAKES



Composite of photomicrographs made from the same heat of mild carbon steel shows the effect of varying columbium treatments on the grain structure of the steel.

The Great Lakes Family of High-Strength Steels



Lets you design superior performance, longer life and less weight into your product. Many diversified applications.



Offers all the characteristic features of N-A-X Finegrain, plus greatly enhanced resistance to atmospheric corrosion.



A series of fine grained, mild carbon steels. They have unusually high strength, toughness and weldability.



Quenched and tempered steels of excellent weldability and toughness, with yield strengths from 75,000 - 110,000 psi.



N-A-X High Manganese and High Manganese Special Killed. These steels give yield strengths up to 50,000 psi.

STEEL CORPORATION'S NEW GLX-W STEELS GIVE ... HIGH STRENGTH TOUGHNESS REDUCED COSTS

Key to the success of Great Lakes' new GLX-W Series of steels is the fine grained internal structure produced by treatment with columbium. This grain refinement also contributes to ductility. And in addition, the GLX-W Series' low carbon and manganese content assures excellent weldability with freedom from underbead cracking under all conditions.

COST AND WEIGHT SAVINGS

Where design permits the replacement of carbon steel with GLX-W steels, weight savings of 20 to 35 per cent, and cost savings of 10 to 25 per cent can be realized. When replacing alloy steels the cost savings can range from 25 to 35 per cent. These steels feature higher yield strengths, greater tensile strengths and increased toughness without costly heat treatments or extensive alloy additions.

The GLX-W Series is so priced that substantial cost reductions can be obtained by weight reduction over mild carbon steel. Cost reduction can also be obtained over alloy steels because of the lower price of GLX-W steels.

STRONGER AND TOUGHER

GLX-W steels are stronger and tougher than ordinary mild carbon steels and in some applications can do the job now being done by the more costly alloy steels.

MANY USES FOR GLX-W STEELS

GLX-W steels are especially recommended for a broad range of applications in mobile equipment and pressure vessels, as well as the transportation and construction fields.

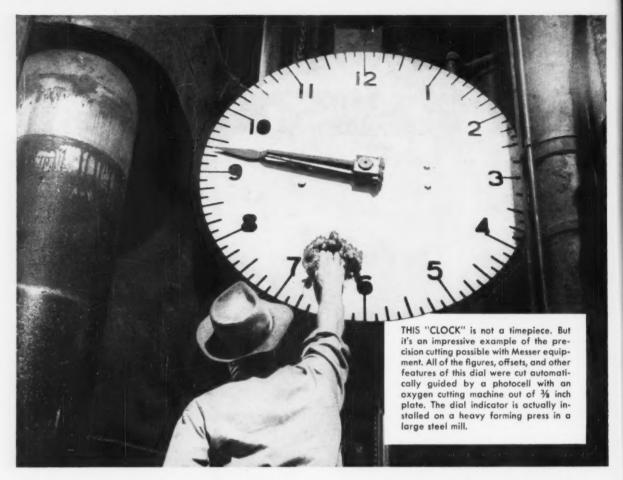


For additional technical information about these economical GLX-W steels write

Praduct Development Division, Dent. A.1

GREAT LAKES STEEL CORPORATION

NATIONAL STEEL CORPORATION



Around the clock ...

MESSER CUTTING MACHINES PERFORM NEW MIRACLES IN AUTOMATIC PRECISION CUTTING

Isn't it "time" you thought about the money-saving advantages you can get through the use of the new and revolutionary cutting techniques now possible with Messer Cutting Machines?

INCREASE YOUR PROFITS

Experience has shown that the Messer cutting machine versatility of design permits greater shop flexibility and the increased use of automation. The result? Lower costs, lower waste, GREATER PROFITS.

This unique oxygen cutting equipment features a

completely engineered system of operation. This leads to new high standards in precision workmanship and greater accuracy.

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In steel mills, in shipyards—wherever cutting machines are used—Messer equipment can increase efficiency. It will pay you to find out now what Messer can offer you. Write us for full information. No obligation, of course. Messer Cutting Machines, Inc., Chrysler Building, 405 Lexington Avenue, New York 17, N.Y.

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6596





Greenlee Air-Feed Automatics offer you a 3-way profit advantage:

 Maintenance and change-over time is reduced by eliminating stock pushers, feed tubes and feed-out cams.

Eliminate Pushers and Feed-Out Cams

- Stock can be automatically air-fed to position in one or more machining stations permitting two or more pieces per cycle.
- Multiple feed-out flexibility enables you to finish machine a variety
 of pieces that ordinarily demand costly second
 operation setups.

If you are running into production headaches on a specific job, Greenlee may be able to adapt an "Air-Feed" to solve your problem. See your Greenlee Distributor.

Write for your copy of Catalog A-405 — first step on the way to more profitable production with Greenlee Automatic Bar Machines.

Removable fittings attach air lines to the stock reel tubes. A vacuum pump withdraws the piston when restocking. Push-button control panel is provided for starting and stopping.

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Your nearby Acco Authorized Sling Chain Distributor now offers a new sling service that saves time and money for you. This is made possible by American Chain's sensational, newly-designed ACCOLOY KUPLEX Sling Chains.

SAFE, STRONG, STREAMLINED

These slings are the latest and greatest development in sling chains. All parts in each leg are manufactured exclusively by American Chain, of the same alloy, and engineered to be as strong as the chain itself. They are of a streamlined design that reduces the possibility of catching or snagging.

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Another valuable feature: all parts remain visible for easy, periodic wear inspection.

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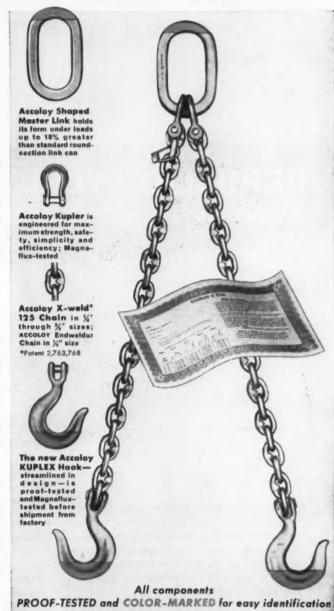
The new ACCOLOY KUPLEX Sling Chains are available ir single-leg and two-leg styles and in six chain sizes, from ½" through ½". All chain is made of Accoloy 125 material. All component parts of each assembly are marked and easily identified as to the size of chain with which they are to be used. Components are color-marked in orange for easy identification.

CERTIFICATE OF TEST, issued by acco and signed by your Authorized Distributor, is furnished with each sling shipment.

GET THE COMPLETE STORY

You will find it to your advantage to get the full story of ACCOLOY KUPLEX Sling Chains. Learn how promptly they can be serviced . . . how easily repairs or parts replacement can be made, should they ever become necessary . . . and how you can benefit from this Great New Distributor Service and this Great New Sling Chain.

Write for Folder DH-39 and name of nearest ACCO Authorized Sling Chain Distributor.

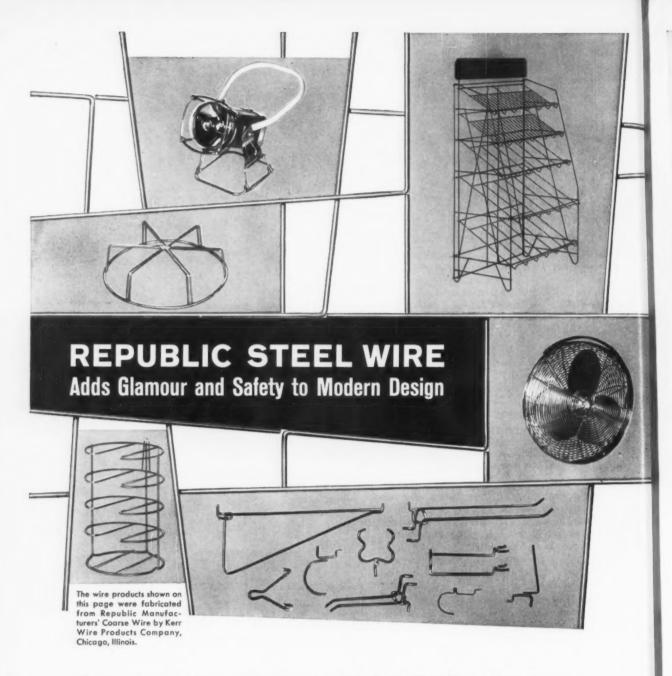


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Wire that it will suit his specific requirements.

Republic produces wire in a wide range of sizes, grades, and finishes. Large tonnages are used to fabricate fan guards, wire partitions, racks, grilles, display stands, reinforcing specialties, threaded fasteners, and many other wire products.

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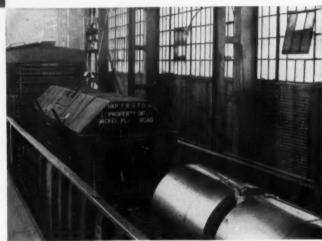


REPUBLIC PIG IRONS HELP PRODUCE highest quality die sets for the metal stamping industry. The Producto Machine Company, Bridgeport, Connecticut, casts die set parts in their own foundry using only raw materials with a definite known analysis, including Republic Pig Irons. The pig iron portion of the charge consists of equal parts of Chateaugay Pig Iron and Republic Malleable Pig Iron. The year-in, year-out uniform chemistry of these fine irons helps Producto produce high quality, laboratory-controlled castings. The company has found that there is no better, no more economical means for insuring strong, flaw-free, easy-to-machine castings. A Republic Pig Iron Metallurgist will give you all the facts on all Republic Pig Irons for quality castings. Mail the coupon today.

REPUBLIC COIL COVERS HELP PROVIDE shipping protection for coil users. These covers offer excellent weather protection, shut out dirt, stop vandalism, eliminate costly replacement of shortlived tarpaulins, eliminate the need for paper wrappings. Covers are easily handled by overhead or trackside crane and are designed for stacking. Republic Coil Covers measure 22 feet long, six feet wide, and six feet high. Two covers are used with each 52-foot gondola car. Send coupon for complete facts.



REPUBLIC STEEL SHEETS HELP PRODUCTION PROBLEMS VANISH. Whatever your product or production requirement, Republic can supply the right steel sheet to solve your problem. As a major producer of flat rolled sheets, Republic has developed and can furnish top-quality steel with the proper characteristics to provide easy fabrication and product dependability. Available in ENDURO® Stainless Steel, Electro Paintlok®, Continuous Galvanized, and Galvannealed. The coupon will bring you complete facts.

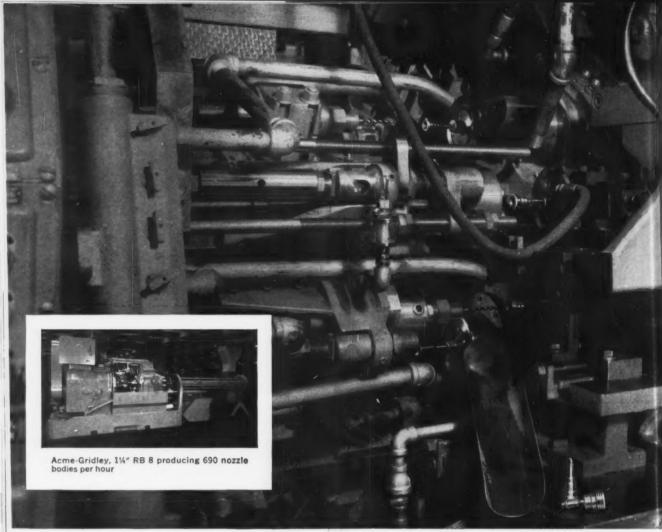


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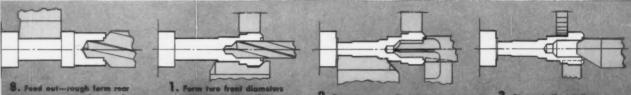
Close-up of tooling zone showing 5th, 6th and 7th positions.

ACME-GRIDLEY ELIMINATES SECONDARY OPERATIONS...

for Eagle Manufacturing Company

- Direct Cost Reduced 48%*
- Production Time Reduced 64%

* Details on request



5. Feed out—rough form reor diameter—counterbore and drill large hole part way 1. Form two front diameters and chamfer head—drill large hole remainder—support

2. Form two rear diameters—rean large hole—face end—support

Stop spindle rotation mill flat—support

As a part of a continuing contribution to all phases of cost reduction, National Acme engineers initiated the develop-

ment work necessary to effect important savings for this 65 year old Wellsburg, W. Virginia company.

The aluminum nozzle body of their hydraulic pump oilers formerly had been produced on a six spindle automatic and two other machines performing secondary operations. Visionary machine tool engineering made possible the application of spindle stopping and positioning on an eight-spindle Acme-Gridley to complete the entire piece in the primary set-up . . . and increase net production.

Advanced design and development such as this, together with wide open tooling zones, independently operated tool slides and the extreme accuracy and flexibility of direct camming . . . makes possible the solution of "unusual" jobs an "every day" occurrence at National Acme.

Write or ask one of our representatives for the complete story on the industry's most modern approach to your cost reduction problem.

NATIONAL ACME'S

"ZONE OF RESPONSIBILITY"

INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by the Eagle Manufacturing Company . . . an "every day" job for Acme-Gridleys.

Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

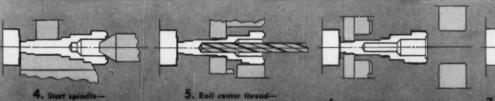
Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

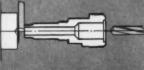
Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.





6. Roll rear thread -thread head



How

RYKO

RYKON Grease has stepped in to deliver lubrication in hundreds of applications where other greases have failed

The reason Rykon Grease can perform under conditions that cause other greases to fail is this: Rykon Grease has a unique non-soap, organic thickener. This thickener holds the oil between its fibers better than any other gelling agent. The thickener is able to withstand extremely high as well as low temperatures. It resists chemical action and remains stable under conditions of severe working and water washing. Rykon Grease has exceptional anti-rust properties.

RYKON Grease's unique properties make it truly multi-purpose. This leads to many

worthwhile economies. With one grease to do possibly every grease lubrication job in a plant, there's no chance for application mistakes. Inventory and handling of many single-purpose greases is reduced or eliminated. Maintenance training and supervisory follow-up is greatly reduced.

More facts about RYKON Grease are yours for the asking. Call the lubrication specialist in your nearby Standard Oil office in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.





High temperature test for grease. Grease samples are spread on metal strips and placed in 350° F. oven for five days, Only RYKON Grease remained workable at end of test.

has performed in ten tough applications



In the metalworking industry, where higher speeds, loads, temperatures and pressures are being put on bearings as a means of increasing productivity of equipment, a new type of grease nas been needed. RYKON is that grease. Here are just 10 examples of how RYKON Grease has performed in tough spots:



Type of Bearings Industry Equipment Conditions Remarks Steel Mill various Outperforms all previously used plain and antihigh temperature. heavy load, water, greases. Less consumption, fewer bearing failures. Steel Mill tin line plain and roller high temperature, Hot caustic water caused other greases to run out and form deposits. RYKON lasts twice as long. Metalworking bearings over high temperature Temperature reaches 500° F. at times. RYKON stays in longer. molten pot Steel Mill pit crane, floor plain and antihigh temperature Lasts twice as long as some other crane, charging friction Metalworking drill head anti-friction heavy load Other greases failed. Running cool on RYKON. No leakage. multi-spindle Auto Manufacturer switches on machine tools Good water protection and dielectric strength at a lower cost than previously Die Caster die cast machines various high temperature Cut down wear considerably. Bearing Manufacturer high speed spindle bearings anti-friction high temperature, heavy load Lasts twice as long as a high priced bearing grease. Does not darken or form varnish. Steel Fabricator pulley bearings high temperature Works where other greases ran out core oven RYKON best ever used. Steel Fabricator oven conveyer ball high temperature All previous greases caused trolley



Oven test shows high temperature performance of RYKON Grease. 1. Metal panel coated with RYKON and placed in oven at 350° F. 2. Same panel after five days. RYKON is still soft and ready to lubricate. 3. Another high-melt grease ready for same test. 4. Same panel after oven test Grease has failed completely.



You expect more from STANDARD and you get it!



bearings to stick. RYKON solved problem.



A pusher-type furnace for heating stainless and alloy steel slabs for rolling. This is typical of the major industrial furnaces for which Salem-Brosius is

well known.

Throughout the world Salem-Brosius has expanded and diversified its service capacity to industry to an unusual degree. The company figures prominently in the engineering and erection of industrial furnaces, heavy industrial equipment and materials handling facilities.

It is a leading producer of various fabricated components of atomic reactors and aircraft engine test facilities, offers a wide line of water purifying, softening and purity testing equipment and has just introduced a system for treating and recovering waste cleaning and pickling acids.

Its line of stainless and alloy fabricated and machined parts is well known throughout the food, chemical and atomic energy industries, as is its ability to produce close tolerance machined assemblies and parts, such as stamping and forming dies for the automobile, aircraft, glass, electronic and other industries, plastic injection molding dies and dies for die castings.

Now, with expanded engineering and erection facilities, Salem-Brosius offers a complete plant engineering service. This service includes engineering and erection . . . a complete turnkey job . . . for plants, production lines or processing facilities for the steel, non-ferrous, glass and other heavy product industries.

If you are contemplating new plant capacity, expanded production facilities or revamped plant layout, it will pay you to inquire of Salem-Brosius.



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Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Co., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania

How many times can this nut be re-used?



ON ANY BOLT OF STANDARD QUALITY, THE NYLON INSERT **ELASTIC STOP® NUT PROVIDES DEPENDABLE LOCKING TORQUE**

for over 50 on-off cycles

The remarkable wear resistance of the tough nylon collar plus its elastic recovery characteristic make it possible to remove and re-use the standard Elastic Stop nut at least fifty times. This familiar red collar-an integral part of an Elastic Stop nut-grips the entering bolt threads with a perfect fit which dampens impact loads and resists turning under the most severe conditions of vibration and shock. When the nut must be removed for routine maintenance, the nylon collar tends to resume its original shape and, on re-installation, grips the bolt threads as effectively as on the original installation.

> Prove it to yourself! Check the coupon for a copy of Recommended Test Procedure for Determining Re-usability.

Re-usability is just one of the advantages of the nylon insert Elastic Stop nut. The constant torque that locks the nut at any position on the bolt: the inertness to gasolines, oils, salt atmospheres, cleaning compounds and common acids: the easy identification on the assembly line or in the field: the one piece construction that simplifies installation and reduces cost-these special features have made the Elastic Stop nut the standard of industry for tough

Elastic Stop nuts are available in thin and regular height hex types in sizes ranging from a watchmaker's 0-80 through 3 inches, also many special shapes to meet your unusual design problems. In standard finishes and materials including carbon and stainless steels, brass,

duronze and aluminum.

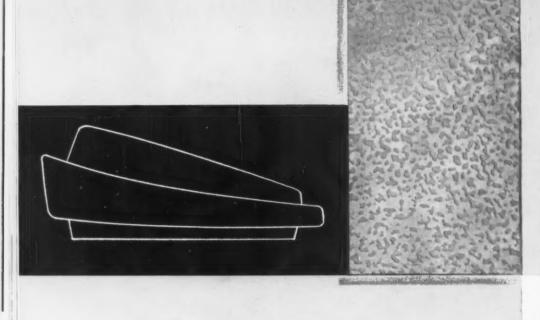
ELASTIC STOP NUT CORPORATION OF AMERICA



DOUBLE DEPENDABILITY

The dependability built into every Elastic Stop nut builds itself into the dependability of every product on which it is used.

Elastic Stop Nut Corporation of America Dept. S31-377, 2330 Vauxhell Road, Union, New Jersey Please send me the following free fastening information: Recommended Re-usability Test Procedure Bulletin No. 5901 showing stop nut design applications on heavy-duty equipment.
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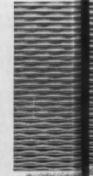
Peter Schladermundt and Sharonart combine for a new design concept.

Tomorrow's business machines will have the low, sleek profile and functional beauty you see in this typewriter design created by the nationally known industrial designer Peter Schladermundt especially for the Sharon Steel Corporation.

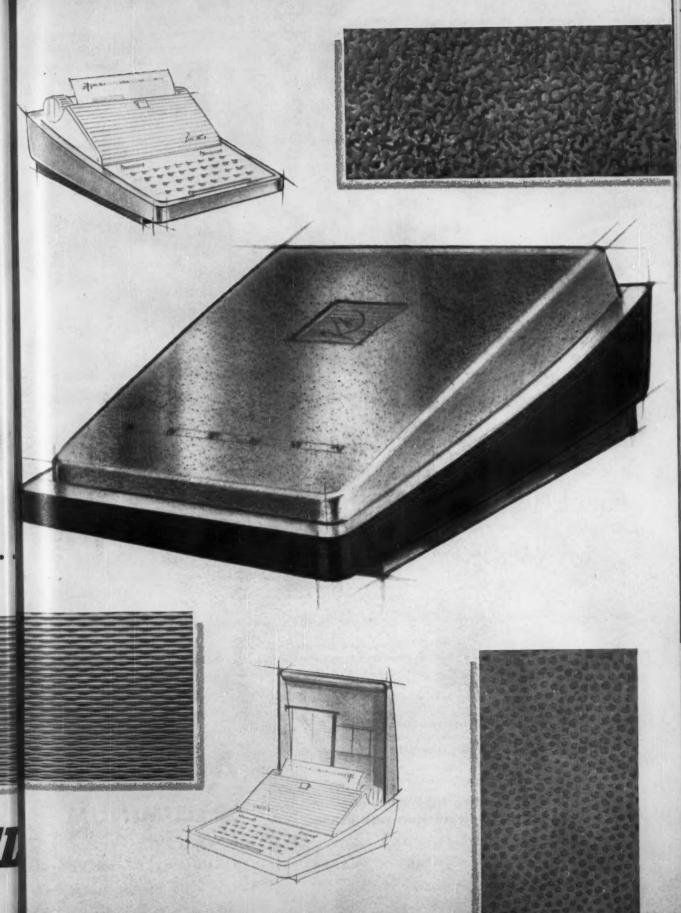
Gone is the bothersome cloth cover and in its stead a regular built-in secretarial workshop that includes typewriter accessory and lighted shorthand book and note compartments. And when the day is through the desk area is made neat by simply dropping the attractive machine lid.

Ingenious? Yes, but perhaps the most important aspect of the design is the functional use of Sharonart, Sharon's popular patterned steel. By fashioning the work areas of Sharonart the usual marks of wear never show, and by forming the cover of this amazing metal many styles are immediately available to the manufacturer by simply changing the pattern . . . and here, too, wear is practically eliminated.

It's the kind of forward thinking that has made Sharonart the most popular material of its kind. Literature and information available from the Sharon salesman in your area or by writing direct to Sharon Steel Corporation, Sharon Pa.



SHARON Quality STEE

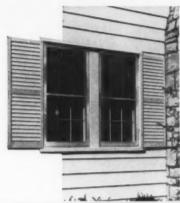


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General Electric offers a complete PLUS LINE of compact power transmission products built to meet all your low-speed drive requirements. Complete PLUS LINE includes: shaft-mounted and separate speed reducers, integral type and all-motor gear motors—each available in a wide range of ratings and configurations for all your applications.

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New Integral Type Gear Motors eliminate couplings or other devices for connecting motor and reducer. Compact design cuts space needs up to one-third, reduces shipping, installation and handling time. Built-in alignment of motor and gear assures proper installation, easy maintenance. Ratings: 1- to 30-hp; 780 to 13.5 rpm.

New All-motor Gear Motors increase application flexibility, accommodate any motor type of same frame size and horsepower. Motor replacement is quick and easy—reducer need not be disconnected from driven machine—to keep downtime to a minimum. Ratings: 1- to 75-hp; 520 to 13:5 rpm.

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For Complete Information contact your nearby G-E Apparatus Sales Office or Distributor, or write for bulletins: G-E Helical Gear Motor Line (GEA-6704), Shaft-mounted Speed Reducers (GEA-6616), Fractional Horsepower Gear Motors (GEA-6133A), Section 851-8, General Electric Co., Schenectady, N. Y.







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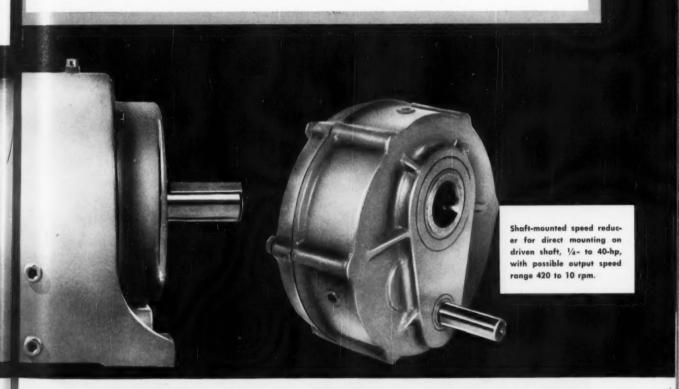
Immediate Shipment—Standard units are factory- and distributor-stocked for rapid shipment to all points. G-E engineering teams using modern plant facilities help meet tight shipment schedules on custom-built units.

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All-motor gear motor



Offset-shaft gear motor

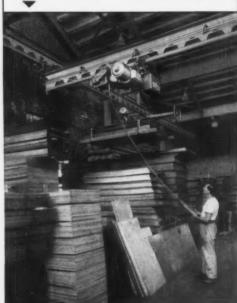


Integral-type gear motor

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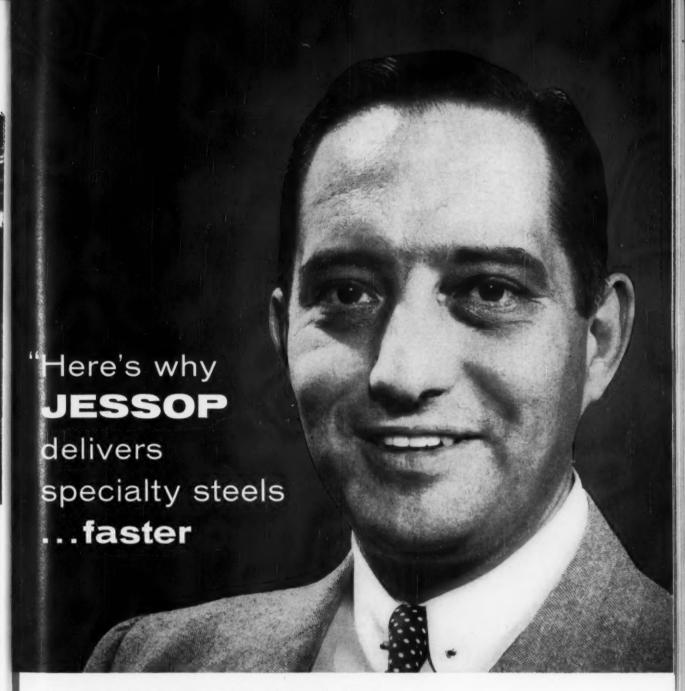
TWO cranes on adjacent runways cut the cost of handling sheet steel in the modern warehouse of Eastern Steel Products, Ltd., Toronto. They enable one man to handle heavy packs quickly and make it easy to maintain orderliness.

The Tramrail System permits far more steel being stored in the building because it can be piled high and because wide aisleways required for floor conveyances are not necessary; thus, much of this space can be used for storage.

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Hydraulic pre-selection of speeds set by handwheel and read on illuminated dial. 16 spindle speeds—ratio 1:50—up to 310 rpm for carbide machining on Model KE 100. Table runs on tapered roller bearings.

Fingertip control for direction of feed and rapid traverse with spring-loaded mono-levers for normal direction plus angular compound feeds. Mono-levers move in same direction as desired feed or traverse movement, simplify correct setting by operator. Specially designed electro-magnetic disc clutches disengage feed instantly with no over-riding or coasting.

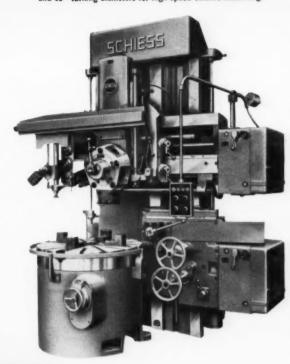
Counterbalanced cross rail and side head. Single lever unlocks, raises or lowers, and locks cross rail simultaneously by electro-mechanical controls.

No bolts or nuts to loosen or tighten by hand.

Slip ring motor provides smooth "load sensitive" acceleration and braking. Variable speed as well as constant cutting speed available. Motor mounted on left side of machine with separate control enclosure. Fingertip control assured by pendant mounting of all necessary control functions. Electrics supplied from all U. S. manufacturers.

Copying attachment with electric tracer for use on cross rail or side head.

Model KE Single Column Vertical Turret Lathes with 40", 50" and 65" turning diameters for high-speed carbide machining.



See why tool engineers call these heavy producers,

"MOST MODERN MACHINES OF THEIR TYPE"

All operating features of KE Series Vertical Turret Lathes are combined in

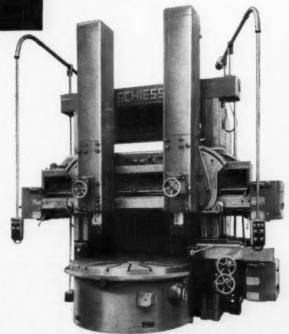
SCHIESS KZ DOUBLE COLUMN VERTICAL BORING MILLS, PLUS-

Heads equipped with steel octagon rams can be swiveled—have automatic feed in vertical, horizontal and angular direction and are independent of one another as to amounts and direction of feed. Table, feed and rapid traverse controls are all contained in the pendant station. Standard model KZ Double Column Vertical Boring Mills are available with 65", 80", 98" and 118" turning diameters.

Get to know these products of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be ready to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on these and other Schiess equipment.

YLVANI

Model KZ Double Column Vertical Boring Mills with 65", 80", 98" and 118" turning diameters,



SCHIESS

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.

NOW TESTS PROVE... **CONTOUR-WELDED*** STAINLESS TUBING IS

SMOOTHER! this greater smoothness provides . . . longer fatigue life

Recent tests conducted on different types of full-finished tubing prove that TRENTWELD® tubing-made by the exclusive Contour-Weld* process-is smoother than tubing made by any other method of manufacture.

TRENTWELD IS SMOOTHER THAN SEAMLESS. The walls of welded tubing generally are smoother than the walls of seamless because welded tubing is formed from uniformly rolled strip steel whereas seamless is extruded from a billet. The tests confirm this point of difference.

TRENTWELD IS SMOOTHER THAN OTHER WELDED TUBING. These tests also confirm that TRENTWELD tubing is smoother than any other welded type thanks to Contour-Welding*, the welding process patented by Trent that virtually eliminates the weld bead.

WHY SURFACE SMOOTHNESS IS SO IMPORTANT. In still other tests, it has been proved that surface smoothness directly affects fatigue life -critical in hydraulic and other pressure applications . . . corrosion resistance—vital in strong chemical environments . . . particle incrustation-which must be eliminated to prevent product contamination.

So, next time you need stainless or high alloy tubing, be sure you specify TRENTWELD. It's also available in titanium, zirconium, Zircalloy and Hastelloyt, in sizes from 1/8 to 40 in. Meanwhile, why not get full details. Send today for the free, 50-page Trent Tubing Manual. Write: Trent Tube Company, Box 2518, Pittsburgh, Pa. †Trademark of Haynes, Stellite Co.



greater corrosion resistance



less product incrustation



WHAT CONVENTIONAL WELDING IS

In conventional welding of tubes, gravity pulls molten metal down inside the tubing to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.



WHAT CONTOUR TRENTWELD IS

With Contour-Welding the tube is welded at the bottom. Gravity still pulls the molten metal down, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

Stainless and High Alloy **Pipe and Tubing**

TRENT TUBE COMPANY Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisconsin • MILLS: East Troy, Wisc.; Fullerton, Calif.

60

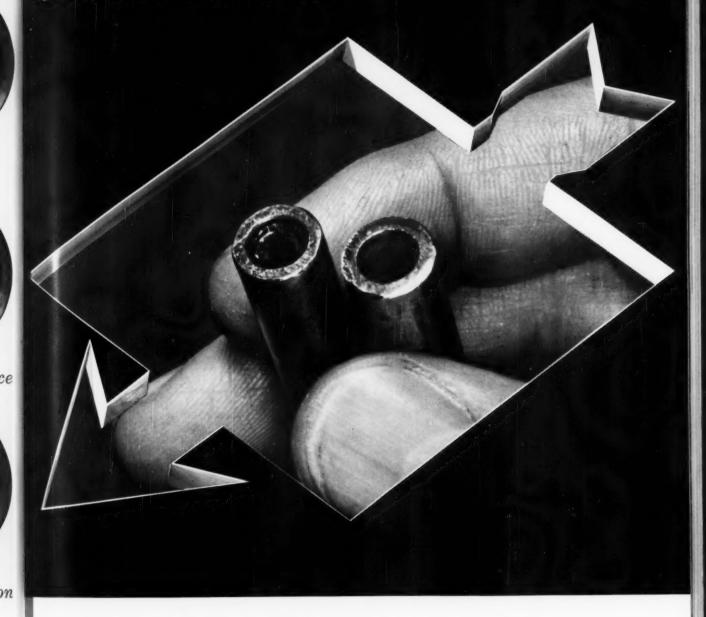
THE IRON AGE, March 26, 1959

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A Sui run th lic lin the sli line th for . . hydra

Wit Sunoc of all:

Quality-the best economy of all



Two oils...two lines...one clogged...one cleaned

A Sunvis 700 oil and a regular oil were run through two equally clogged hydraulic lines. The regular oil couldn't remove the sludge. The Sunvis 700 oil cleaned its line thoroughly. That's one job it's made for... to clean out sludge deposits in hydraulic lines while it transmits power.

With a Sunvis 700 oil—like every Sunoco oil—you enjoy the best economy of all: the economy of quality. A Sunvis

alif.

700 oil lasts longer. The machinery it protects lasts longer. It prevents rust... ups output by reducing downtime.

FREE Trouble-Shooting Chart will help you spot and cure common hydraulic system troubles. For your copy, write to:

Sun Oil Company, Philadelphia 3, Pa., Department I-12.

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES





Need large precision parts?



300-lb. precision stud, meeting rigid mechanical and metallurgical specifications, exemplifies capabilities of SPS Nuclear Products Division. SPS is a major supplier of high-reliability structural components for nuclear reactors and related equipment, as well as for other types of power-producing machinery.

SPS Nuclear Products Division can meet your most exacting requirements

The SPS Nuclear Products Division offers unique facilities for handling your large-diameter precision machine work. This includes not only outsize bolts and studs, but also such items as control rod housings, coolant pump components, and large bushings-in conventional metals and in various super alloys.

Among the division's special-purpose machinery are batteries of modern tracer lathes and milling machines, some capable of swinging sections 3 ft. in diameter and 11 ft. long. There is also unusual equipment for deep hole drilling and internal grooving, including models able to produce precision holes up to 80 in. deep. Available too are SPS' extensive heat treat and plating facilities, as well

as the services of the company's Navy-certified welders.

To meet the need for extreme reliability in its field, the Nuclear Products Division maintains a separate quality control staff to provide 100% inspection of its products. It also manufactures its own special gaging (unavailable commercially) to check out unusually large or complex parts. In addition, the division has access to the SPS fastener testing laboratory-largest of its kind in the U.S. -and the SPS Metrology Laboratories, recently set up to study fit problems of precision mating parts.

New Folder 2499 gives further information on this specialized service of SPS-manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. For copies, write Nuclear Products Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.



Jenkintown · Pennsylvania

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada Ltd. • Unbrako Socket Screw Co., Ltd.

protection is stainless steel

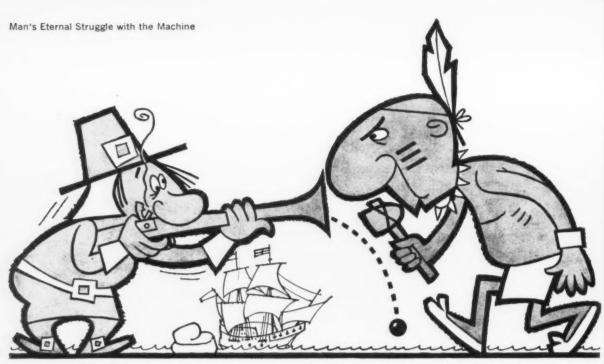
Summer or winter the car with plenty of Stainless Steel is easy to clean and keeps its good looks under the roughest conditions of driving and weather.

No other metal offers the freedom of design and fabrication, economy of care and the durable beauty that serves and sells like Stainless Steel.

McLOUTH STEEL CORPORATION, Detroit 17, Michigan



for automobiles



RISING COSTS AND SHRINKING PROFITS EXERT UNUSUAL PRESSURES ON PROCUREMENT

What is the risk of letting conditions tempt you to select the lowest bid?

You're in a tough spot to say the least!

Because if you care at all about your future or your company's profits, you take every precaution to make sure that "real deal" price tag is hanging on a machine that will do your job.

Obviously, price alone is indicative of nothing more than the bidder's determination of cost, plus the profit any manufacturer must earn to remain in business—nothing more—no true suggestion of value . . . and, of course, never even a hint of equipment suitability to *your* needs.

Unfortunately, the lowest bid often results from price cutting under competitive pressures. And price cutting necessarily down grades equipment value—unless the price-cutter is in business for reasons other than making a profit!

Sciaky resistance welding and production equipment must satisfy your manufacturing requirements. And Sciaky manufacturing operations must earn a profit just as your company must. That's why Sciaky first determines what will satisfy your requirements, and then figures the cost of putting it to work for you.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

Recently a procurement official boasted of his subterfuge to reduce costs . . . "tell every vendor his bid is way out of line, and you can brow-beat them into substantial price reductions." Besides the question of ethics, he's cheating his company of its ability to manufacture profitably, as well. Because no vendor can deliver more than he gets paid for—that is, not if he intends to stay in business. When that official's manufacturing operations begin to sag under the dead weight of phony equipment bargains, who do you suppose is going to be holding the proverbial bag?



70

SCIAKY BROS., INC., 4923 W. 67th STREET, CHICAGO 38, ILLINOIS . POrtsmouth 7-5600

EC-1357 cuts costs, makes possible stronger sandwich panels



LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials without heat. You'll speed production, cut costs, build in high strength for non-loadbearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. YP-39, St. Paul 6, Minnesota.



ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY ... WHERE RESEARCH IS THE KEY TO TOMORROW



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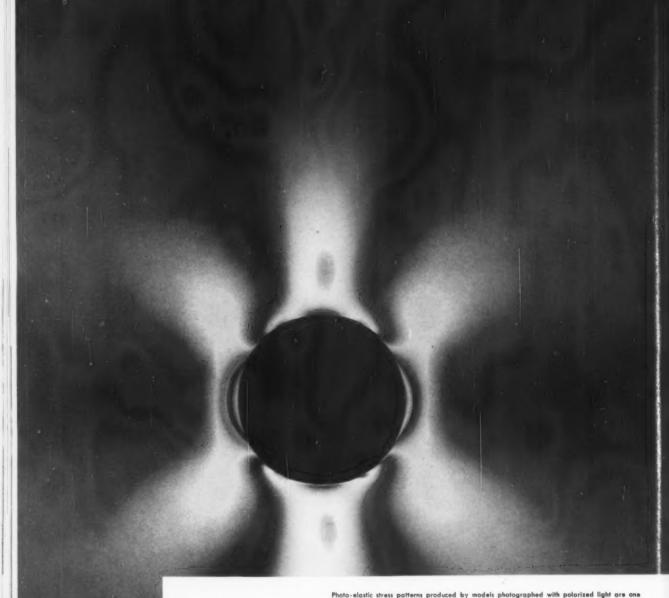


Photo-elastic stress patterns produced by models photographed with polarized light are one of the modern analytic tools available for ever-increasing perfection of Malleable iron castings.

Strength is (

Malleable

The strength crucial in spiraling the heave of diesels' pistons into unresistible power, in protecting lives as automobiles hurtle down endless highways, and in every link of chain that swings massive loads overhead, is yours to mold into tomorrow's dynamic engineering achievements with Malleable iron castings. Yet Malleable provides this strength in combination with toughness, producibility and economy that makes Malleable castings the finest, most versatile metal available.

For information or service, call on one of the progressive firms that identify themselves with this symbol— MEMBER



If you wish, you may inquire direct to the Malleable Castings Council, 1800 Union Commerce Building, Cleveland 14, Ohio, for information.

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How to Select the Best Metal o Perform a Given Set of Functions

Any equipment part can be described, at least approximately, in terms of the functions it must perform. That is, it must provide a certain strength plus resistance to wear, fatigue, impact or corrosion. The finished part must provide the best combination of all necessary factors at the lowest possible cost—a cost that must include machining, finishing and assembly where applicable.

Unique Production Method Combines Desirable Characteristics

The amount and form of carbon in ferrous metals is of prime importance. The carbon content of Malleable iron (2.00 to 2.60%) provides good fluidity at the pouring stage. Yet neither flake graphite nor combined carbon is present in finished standard Malleable iron.

As the photomicrograph of standard Malleable iron shows, the carbon has been transformed into temper carbon nodules in a matrix of ferrite during the heat-treatment given all Malleable iron

castings. The result is a metal with a unique combination of high strength, toughness and machinability.

Pearlitic Malleable irons differ from standard, or ferritic, Malleable only in that a controlled amount of the carbon is combined with the iron to form a pearlitic matrix around the temper carbon nodules. This increases strength, hardness, wear resistance and modulus of elasticity, while retaining good ductility and machinability.

TENSILE PROPERTIES - A.S.T.M. MINIMUM SPECIFICATIONS

Standard and Pearlitic Malleable Irons									
Designation	Tensile Strength p. s. i.	Yield Strength p. s. i.	Elongation % in 2 in.	Ratio of Tensile to Yield %					
Standard									
35018	53,000	35,000	18	66					
32510	50,000	32,500	10	65					
Pearlitic									
45010	65,000	45,000	10	69					
45007	68,000	45,000	7	66					
48004	70,000	48,000	4	69					
50007	75,000	50,000	7	67					
53004	80,000	53,000	4	66					
60003	80,000	60,000	3	75					
80002	100,000	80,000	2	80					

Strengths up to 135,000 p.s.i. tensile and 110,000 p.s.i. yield are produced commercially under individual producers' specifications.

TYPICAL BRINELL HARDNESS NO. RANGES

Pearlitic Malleable Irons											
Designation	45010	45007	48004	50007	53004	60003	80002				
B. H. N.	163-207	163-217	163-228	179-228	197-241	197-255	241-269				

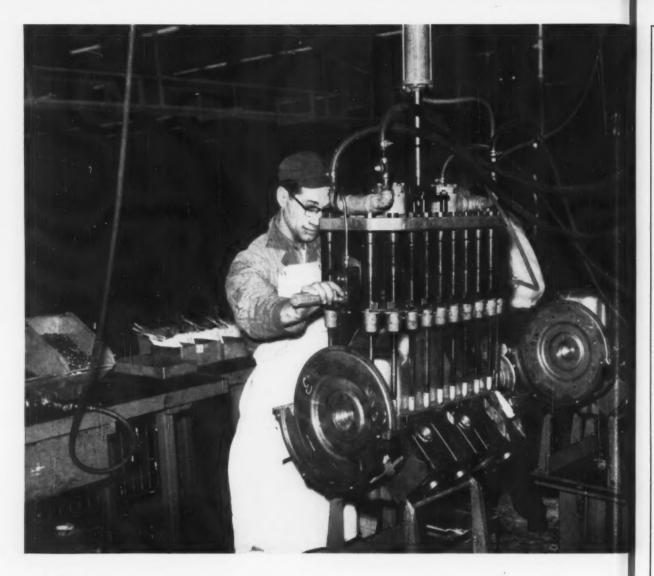
New Savings Result

From the wide range of properties obtainable, a Malleable iron may be selected that will most completely meet ideal design and functional requirements. Because of the great latitude of producible sizes, from a fraction of an ounce to hundreds of pounds, Malleable can be used for a wealth of applications.

Malleable iron's economy is derived in two ways. First, the casting process is generally accepted as the most economical method of producing a finished part. Secondly, being the most machinable of all ferrous metals of similar hardness, cast or otherwise, Malleable iron castings provide exceptional economies in time, tool and power consumption. Today's Malleable iron castings offer tremendous strength, uniformity, versatility and economy. The producers of Malleable castings are anxious to assist you in getting maximum "usability." Why not let their modern design, testing and production facilities work for you?

Send for Special Data Unit

Your copy of Data Unit No. 101 containing additional information on the benefits you can derive from Malleable iron castings is available from any member of the Malleable Castings Council. If you wish, you may direct your request to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.



R/M Homoflex Hose is Strong, Light, Flexible . . . Easier Handling . . . Lasts Longer

The unique construction of Homoflex Hose adds up to real labor and costs savings wherever air, water, and other fluids and gases are handled. It's strong, yet light in weight and "flexible as a rope". Because it's mandrel-made with no pre-set twist, Homoflex coils and uncoils freely in any direction without kinking! A homogeneous construction, strength member and tube are virtually inseparable, even under the most severe condi-

tions of use around the plant. Mandrel-made also provides uniform inside and outside diameters for faster, easier, safer coupling.

Homoflex Hose reduces hose costs because it does a better job and it lasts longer. Ask your R/M representative about Homoflex and other types of R/M hose for factory use. He'll show you why R/M constructions assure "More Use per Dollar" on every job.

THE I

HOMOFLEX CONSTRUCTION

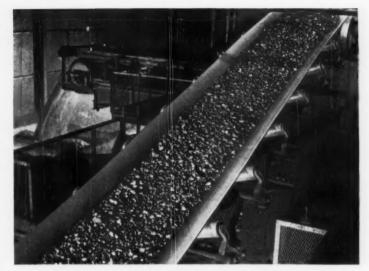


- Super-Strong
- Precision Built
- Flexible as a Rope
- Light Weight

Weighs less than any other hose of equal working pressure.

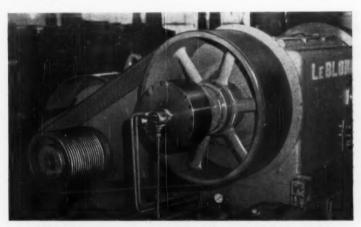
Note in cross section how specially designed braid permits the rubber tie-gum to penetrate and bond the braided plies during the plastic stage of vulcanization. This results in an inseparable tube-to-cover bond. Write for Bulletins M694 and M610.

"More Use per Dollar"



RAY-MAN CONVEYOR BELT CUTS HANDLING COSTS

Industry's only compensated conveyor belt relieves stress of outer plies—both top and bottom—to assure longer life and lower costs for handling bulk materials. Ray-Man troughs easily and trains naturally . . . has the strength and flexibility to carry full loads even where relatively thick, narrow belts are used over small pulleys. Holds fasteners under most severe conditions . . . requires no breaker ply . . . protected against wear, tear, cuts and abrasions with exclusive "XDC" Cover! Write for Ray-Man Bulletin M302 and bulletins on other R/M belts for a wide variety of applications.



R/M POLY-V® DRIVE-MORE POWER IN LESS SPACE

This patented new power transmission drive features a single, endless parallel V-ribbed belt running on sheaves specially designed to mate precisely with the belt ribs. The results? The highest horsepower capacity per inch of drive-width yet possible . . . up to 50% more power delivery in the same space as a conventional V-belt drive—or equal power in as little as % the space! Single unit belt design eliminates belt "matching" problems . . assures constant belt speed ratios from no load to full load to provide the smoothest running, coolest running—longest wearing drive for your power driven equipment. Just two cross sections of Poly-V* Belt meet every heavy duty power requirement. Write for Bulletin M141.

*Poly-V is a registered Raybestos-Manhattan trademark.

BM919

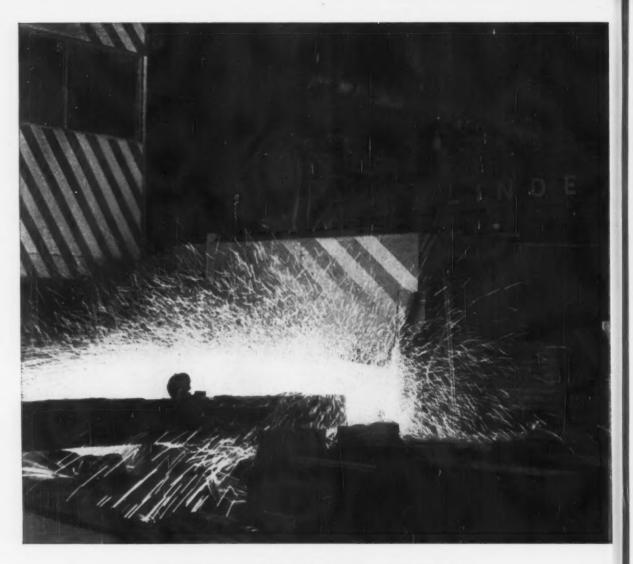
BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES



59

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels * Brake Blocks and Linings * Clutch Facings * Asbestos Textiles * Mechanical Packings * Engineered Plastics * Sintered Metal Products * Industrial Adhesives * Laundry Pads and Covers * Bowling Balls



LIN-DE-SURFACER MACHINE HOT-SCARFS 4.27 MILLION TONS IN 27 MONTHS

Weirton Steel Company, Division of National Steel Corporation, set the record. Of the 65 *Lin-de-Surfacer* machines serving steel plants throughout the world today, this is the champ -4.27 million tons in just 27 months.

Mechanized scarfing is the fastest, most economical way to upgrade surface quality. Your costs depend on your production because you lease the *Lin-de-Surfacer* machine on the basis of the tonnage it processes. It can be rolled on or off the production line in seconds. Scarfing speeds can reach 195 ft./min.

And-most important-savings over hand-conditioning methods are estimated conservatively at \$1.50 per ton-are often much higher.

"Linde," "Linde-Surfacer," and "Union Carbide" are registered trade-marks of Union Carbide Corporation. Linde Company—a leader in the production and distribution of oxygen and acetylene—pioneered the development of mechanized scarfing. To find out how hot-scarfing can help your operations, call the nearest Linde office. Or write Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada: Linde Company, Division of Union Carbide Canada Limited.



Ansco

Industrial X-ray

best in sight



When more than human vision is needed to evaluate the perfection of critical parts, Ansco X-ray films are looked to as the finest for radiographic flaw detection. That's because Ansco specifically designs its emulsions to record high contrast images of the smallest defects in the toughest samples. If you haven't as yet tried an Ansco industrial x-ray film, why not make a test soon?

Test Ansco's Superay "A", Superay "B", or Superay "C" films on your routine or difficult 'problems. Notice how the superior readability cuts evaluation time and makes the detection of rejects quicker and surer.

Why not contact your local Ansco representative today and learn, at first hand, how inspection department functions can be speeded up at lower costs' Ansco, Binghamton, N. Y. A Division of General Aniline & Film Corporation.

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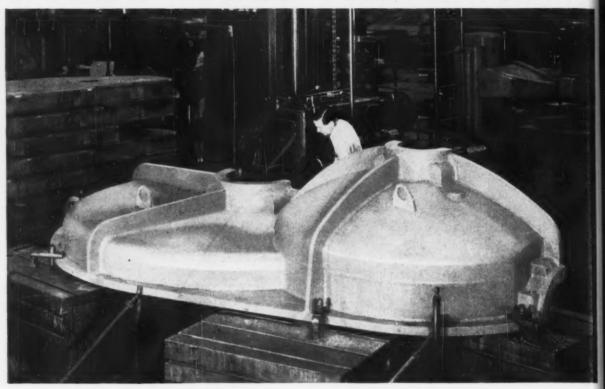
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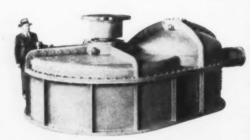
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1959

STEEL-WELD FABRICATION ...



PRECISION WELDMENTS Fabricated and Machined to Specification!



FABRICATED, MACHINED and ASSEMBLED
IN THE MAHON PLANT

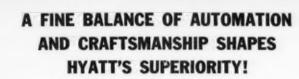
Use WELDED STEEL for 100% Predictability and Greater Strength with Reduced Weight The weldment illustrated above is one of two similar parts of a gear housing for a large speed reducer. The craftsmanship which is plainly evident in this piece is typical of Mahon precision in the production of thousands of Steel-Weld Fabricated parts and assemblies produced year after year for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment.

When your design calls for weldments of any kind, you, too, will want to discuss your requirements with Mahon engineers; because, in the Mahon Company you will find a unique source for weldments or welded steel in any form . . . a fully responsible source with a long and enviable performance record, and unusual facilities for design engineering, fabricating, machining and assembling.

See Sweet's Product Design File for information, or have a Mahon sales engineer call at your convenience.

THE R. C. MAHON COMPANY • Detroit 34, Michigan SALES-ENGINEERING OFFICES IN DETROIT, NEW YORK and CHICAGO

MAHON



Traditional skill and craftsmanship aided by modern electronic devices, accurate gauging and rigid quality control has made HYATT the recognized leader in cylindrical bearings. No matter how great the quantity, the same high quality is consistently maintained. For maximum performance per bearing dollar, insist on . . .

HYATTHY-ROLL BEARINGS

HYATT BEARINGS DIVISION . GENERAL MOTORS CORPORATION . HARRISON, NEW JERSEY

Available through United Motors System and its Independent Bearing Distributors

NO BEARINGS carry radial loads like cylindrical bearings . . . and NOBODY knows them like

ADE IN



Forming no-sag springs. Pittsburgh Steel's 8 gage no-sag

Speed of operation and severe bending call for just the right wire is bent into a regular no-sag spring for theater seat. combination of tensile strength and ductility.

No-Sag Spring Pioneer Uses Pittsburgh Steel Co. Wire Because Of 'Good Quality, Service, Delivery'

The company which introduced the no-sag spring in the United States 25 years ago today uses Pittsburgh Steel Co.'s No-Sag Wire because of "good quality, service and delivery."

Since 1934, No-Sag Spring Co. of Detroit has grown to a 22-plant operation, spreading from New Jersey to California and extending to a dozen foreign countries.

No-sag springs and the special no-sag wire from which they are formed were unheard of when the late Henry Hopkes Sr., founder of the firm, obtained patent rights from the German inventor and went into business in Detroit.

Now widely used in the furniture and automobile industries, no-sag springs made necessary the development of a special hard drawn, lead patented, high tensile wire made from selected steel heats. These specifications are met handily by the skilled steelmakers and wire drawers at Pittsburgh Steel Co.

No-sag wire has to be tailormade because of the high-speed operation it undergoes on forming machines, many of which were designed by No-Sag Spring Co. engineers. Extra toughness is required to allow twisting short lengths to make ribbon lengths. Special restriction of cast is necessary for proper control in forming the springs.

Pittsburgh Steel consistently fur-

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rupte mach losse nishes coils of no-sag wire with tensile strengths up to 240,000 psi for wire .192 in diameter. At the same time, the wire is ductile enough to be wrapped on its own diameter as a mandrel without cracking or breaking.

G. L. Stine, who heads up research and development for No-Sag Spring Co., said:

"We have found Pittsburgh Steel wire to be of excellent quality and their service and delivery have been equally good. Pittsburgh Steel has certainly helped maintain and improve our reputation for quality springs in the industry."

• Close Tolerances—No-Sag Spring Co. also insists that the diameter be uniform and that the wire be free of surface defects, pipe or kinks.

The company forms wire into three general types of no-sag springs. Precise engineering at No-Sag Spring determines the best type of spring

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for any application.

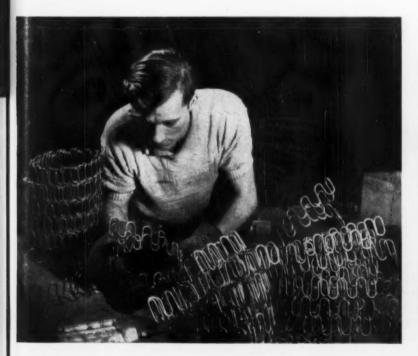
Regular no-sag springs have the original size and shape loop that was first developed with a loop approximately 1% inches wide and a %-inch space between the parallel wires. XL-No-Sag springs have an extended loop with a loop size of 1% inches and 1%-inch space between parallel wires. Supr-Loop strands have a loop size of three inches wide and 1% inches between parallel wires.

Whether you're making no-sag springs or using one of the other grades of wire—from rope wire to cold heading wire, you'll benefit from the steelmaking and wire-drawing skill which has gone into the development of such special wires as no-sag spring wire.

You'll like the same kind of service and deliveries which Pittsburgh Steel Co. gives the No-Sag Spring Co. Bring your wire needs or coiling problems to the trained people at Pittsburgh Steel Co. today. Help is as close as your telephone. Just call the sales office nearest you. See list below.



Experimental Department constantly seeks new applications. This new type of day bed shows two types of no-sag springs—regular loops in top half and Supr-Loops in bottom.



Back springs for sofa have ends turned back on themselves to form V-Arcs.



"Soft End" for easy chair seat is made so that end of spring remains free. Installed in chair, ends will be connected along edge of seat. Resiliency of wire can be depended upon to retain shape of spring. Freedom from defects in the surface of the wire provides uninterrupted production on No-Sag Spring's machines . . . cuts down rejects and losses from scrap.

Pittsburgh Steel Company

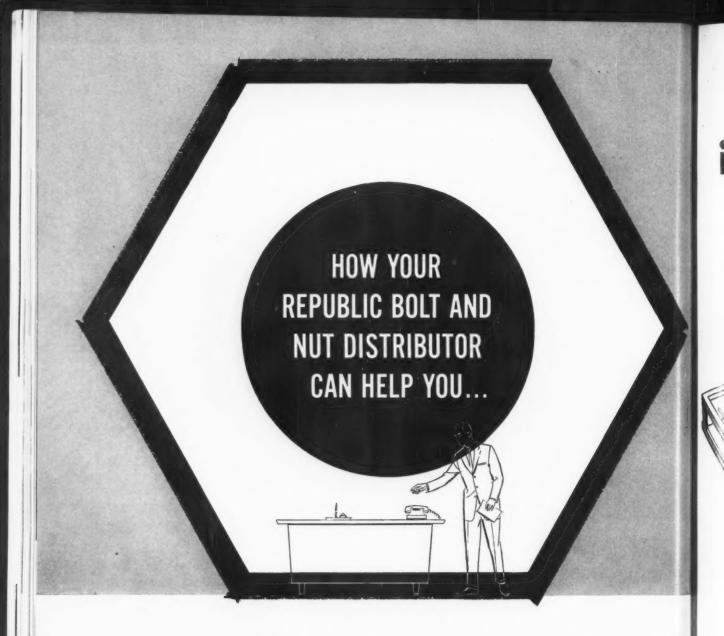
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No matter how effective your present fastening methods may be, there is always the chance that you can do the job more efficiently and more economically, without sacrificing quality or strength. A consultation with your local Republic Bolt and Nut Distributor, and his staff of fastener specialists, may point the way.

Keeping abreast of developments and trends in the fastener industry is a vital aspect of your local distributor's business. In doing so, he is backed up by the know-how of the experts at Republic Steel—a company whose fastener background spans a century. This experience is at your command.

Your local distributor is a vital cog in today's industrial system—ready to help you at any time in any way he can. His skill at maintaining large and diversified fastener inventories, in all types and sizes, materially reduces your own overhead and production costs.

Whether you need specialized information, quick deliveries of fasteners in any quantity, or one of the many other services he offers you, it will pay you to get in touch with your local Republic Bolt and Nut Distributor. Telephone him now.

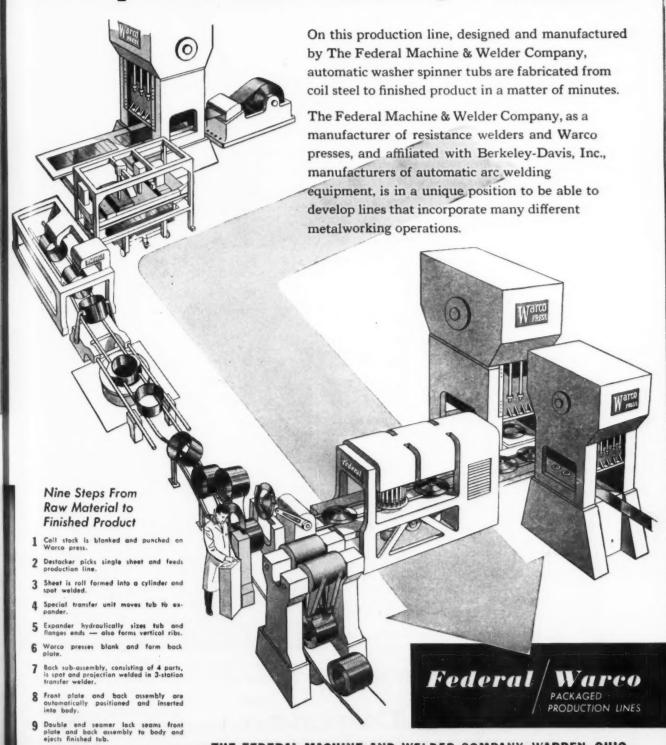
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REPUBLIC Bolts and Nuts



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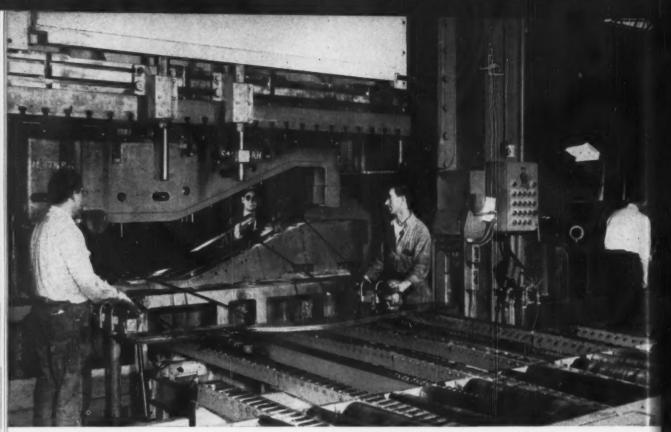
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Sequence of operations controlled by static relay system designed and built by Federal.

THE FEDERAL MACHINE AND WELDER COMPANY, WARREN, OHIO
Affiliated with Berkeley-Davis, Inc., Danville, Illinois



New design permits tooling up of one bolster (right) while press is producing parts from die on other bolster. This press, at the A. O. Smith Corp. plant, in Milwaukee, Wis., is expected to achieve 94% utilization.

Press downtime . . . down from hours to minutes

THE NEW HAMILTON SLIDING BOLSTER PRESS:

- Reduces parts inventory
- Meets changing schedules on time
- Cuts number of presses required where die changing is frequent
- · Eliminates long and costly die setting operations
- Provides storage area within press frame
- · Available in all types and tonnages

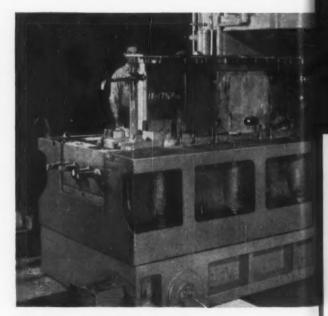
No longer need hours – and sometimes days – be wasted in unproductive press downtime while changing dies for another run. This major step in stamping and forming press room operations is made possible with the Hamilton Sliding Bolster press.

A 1250-ton 2-point, top-drive press equipped with two sliding bolsters recently installed at a Midwest automobile parts plant is proving the economies of the innovation—on parts up to 12 ft. long.

While the press produces parts from a die mounted on its operating bolster, a second bolster can be tooled for the next run. Changeover time is negligible—pushbutton-controlled hydraulic motors quickly and positively position the second bolster for speedy startup and production of the next part.

In the open position, the bolster is clear of the press frame for easy die change and setup. Crane handling of heavy dies is absolutely unobstructed.

For further information, write Dept. 2-C



Pushbutton-operated bolsters slide into place in minutes. Downtime for changing dies is virtually eliminated.

Hamilton Division Hamilton, Ohio

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"FLIGHT OF PROGRESS" a stainless steel sculpture by Robert Edward Hamilton

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1 out of every 7 tons of stainless used in the last 15 years came from the melt shop of J&L's Stainless and Strip Division. To achieve that remarkable record as a supplier of semi-finished products, J&L set up its own standards and specifications – far more exact, more precise, more rigid than those in general use. Today J&L leads the industry in melting practice standards—the point where quality starts.

Chances are 1 out of 7 you have already enjoyed J&L quality in stainless, without knowing its melt shop origin. Now you can eliminate chance! Newly installed cold rolling and finishing equipment in operation at Louisville, Ohio, makes J&L the most modern integrated source for finished mill products—stainless sheet, strip, bar and wire. All of traditional J&L stainless quality.

On your next stainless steel order specify "J&L Consistent Quality." Don't pay for less.

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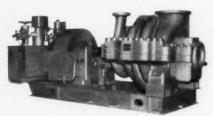
John L. Parris, Manager Centrifugal Compressor Sales, The Cooper-Bessemer Corporation, explains...

How you gain four ways when you specify Cooper-Bessemer Centrifugal Compressors

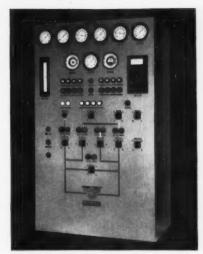




Horizontally split, process air or gas centrifugal compressor. Range: Up to 100,000 cfm.



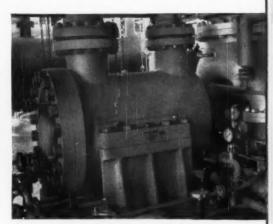
Horizontally split, intercooled centrifugal compressor designed for low cost shop and process air and gas. Up to 30,000 cfm.



Installations can be integrated with Cooper-Bessemer En-Tronic Controls all the way from simple monitoring to complete system automation.



Pipeline centrifugal booster with a history of record-breaking performance. Up to 20,000 bhp.



Barrel type centrifugal compressor for gas and air at pressures up to 5000 psi.

To get the most for your compressor dollars, it will pay you to check into Cooper-Bessemer Centrifugal Compressors because these fully-proved products offer you a combination of four outstanding advantages:

1. You get a design that's matched to your needs. A wide range of types and sizes of Cooper-Bessemer Centrifugal Compressors are available to assure optimum performance on your processing or air supply application.

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prompt attention to your operating needs...with resulting reduction in your inventory and downtime.

Our nearest office will gladly supply complete information on Cooper-Bessemer Centrifugal Compressors to meet your needs exactly. Call them today.

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Would you take a parrot's word for it?

Why take anybody's word for it?

Static and dynamic balancing of rotating parts is a critical quality control process. The elimination of destructive vibration is "life insurance" for your product. It is worth doing *correctly*.

Test before you buy! When you buy a balancing machine, you'll want to outline your requirements specifically—and insist on comparative tests. Only then can you *know* what you're buying. No reliable supplier of balancing machines will refuse to cooperate in these tests!

Gisholt shows you. Gisholt invites you to see your work balanced on a Gisholt Balancer and to observe a series of scientific balancing tests—to prove that your tolerances and production requirements will be met, before you buy!

FREE BOOKLET. Because there are vast differences in balancing equipment, it is important to know how to compare competitive machines. Gisholt has released a new booklet, "Performance Tests for Balancing Machines." It explains basic facts about balancing, tells you how to analyze your requirements and outlines a series of performance tests to prove whether or not proposed equipment will meet your specifications.

Ask your Gisholt Representative for this new booklet or write for your free copy.



Gisholt 6U Balancer handles variety of rotors from 350 to 10,000 lbs. This 5600 lb, double-inlet wheel and shaft assembly is rotated at 150 r.p.m. and balanced within .0003" bearing displacement. Despite heavy workpieces and massive machine, no special foundation is required for accurate operation.



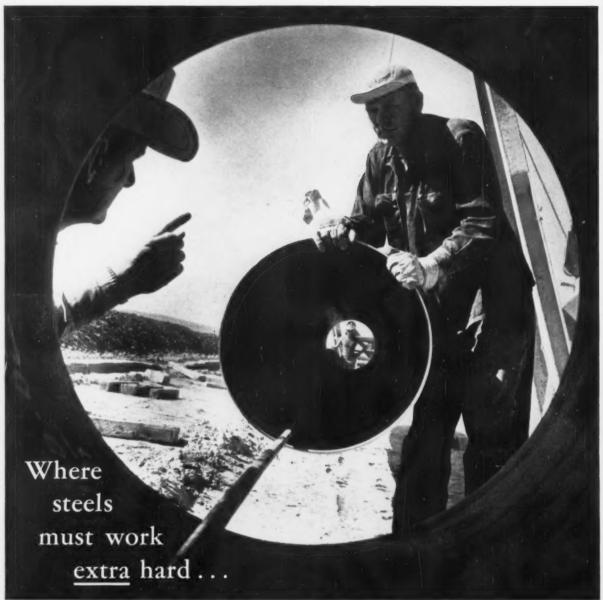
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... use Vancoram Grainal Alloys! They improve the physical properties of high-strength steels, and are also useful as final deoxidizers. As additives to stainless and heat-resistant steels, Grainal Alloys improve hot-working characteristics

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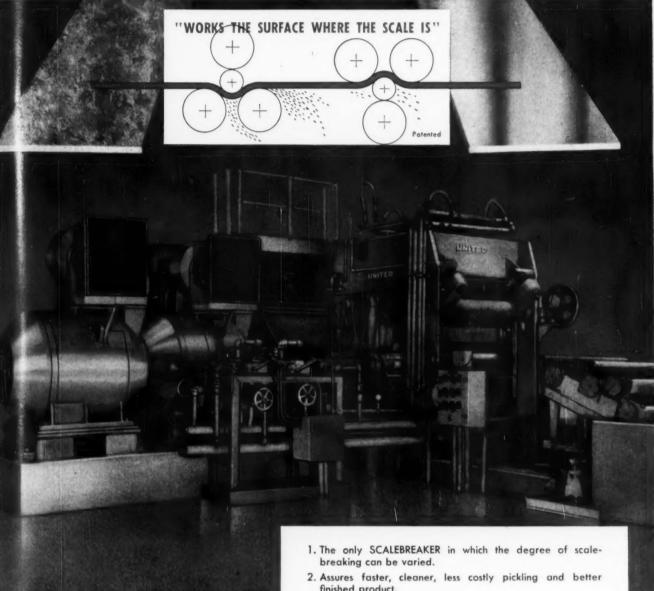
Remember this: Grainal Alloys effect savings by reducing alloy requirements and by cutting fabricating costs; and there are many reasons why these alloys are useful in deep hardening and carburizing steels. For complete information, write for the free booklet. "Grainal and Its Use." Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

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problem:

A chemical company, using a cold water heat exchanger to cool caustic soda and sodium hypochlorite, was being plagued by breakage in the 2" dia. glass tubing. Shutdowns occurred about three times monthly... each time consumed about 15 extra man-hours to change tubes... necessitated additional processing of contaminated hypochlorite.

solution:

A heat exchanger was fabricated from Carpenter Titanium Tubing. Ten-foot lengths of this tubing were vertically submerged directly in each caustic soda processing vat.

results:

Maintenance costs reduced nearly \$1500 annually! No tubing failure since Carpenter Titanium Tubing was installed two years ago! Increased production! Improved product quality! With a heat exchanger in each processing vat instead of separate unit, pumpand pump plumbing previously required to transfer highly corrosive fluid, and maintenance problems connected with them, have been eliminated!

Carpenter Titanium Tubing tames corrosion ... reduces costs

Why not take advantage of the corrosion and cavitation resistance, light weight and high strength of Carpenter Titanium Tubing? It is the *least expensive* tubing you can use under many corrosion influences. It withstands conditions that reduce service life of ordinary metal . . . assures minimum downtime, fewer replacements.

Three commercial grades—C40, C55 and C70—in tubing sizes up to $4\frac{1}{2}$ " O.D. are available.

In the food, chemical, pulp, paper and allied industries . . . the long, trouble-free service life of Carpenter Titanium Tubing provides countless opportunities to improve equipment performance and to reduce operating and maintenance costs. Contact your local Carpenter representative or distributor for the full story.

THE CARPENTER STEEL COMPANY

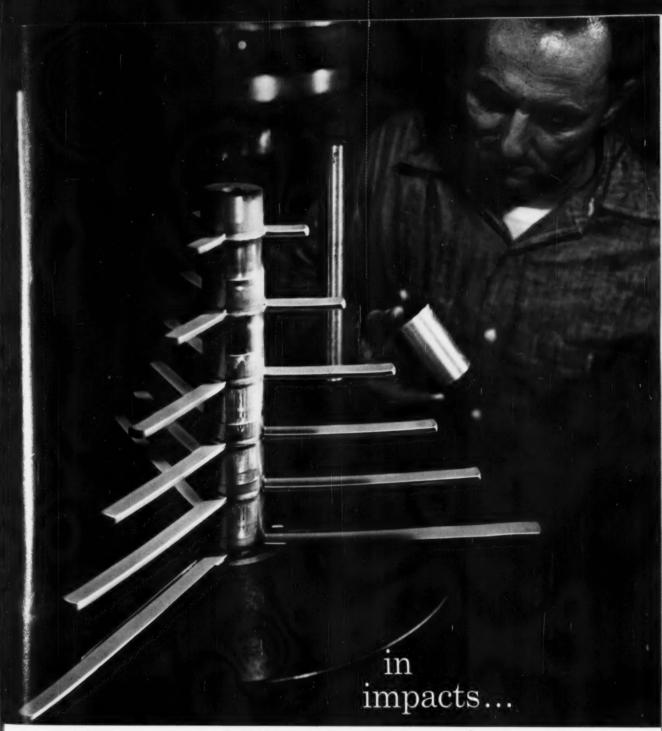
Alloy Tube Division

Union, N. J.



Write for Bulletin T.D. 115A. Contains complete data on the properties, corrosion resistance and application benefits.





Alcoa puts the metal where you want it

This "tree" represents six stages in the growth of an Alcoa® Impact. Actually the flow of metal occurs at a blink of the eye, but we've shown it in stages, outside the die for the sake of clarity. Furthermore, the finished piece (which you see on the bottom) has no practical use. It has, however, practical value. It starts the imagination fiddling with a host of design problems that involve the joining of several spokes to a central hub. For instance, it's not hard to imagine the spoke frame for an automobile steering wheel or horn ring sitting in its place. If that idea has you going, bear in mind that we can make round, oval, square and irregular parts

the same way. Finished parts in many instances have greater strength than forgings—with tolerances down to plus or minus 0.005 in.—with a smooth, corrosion-resistant finish of about 125 microinches. A clear case of putting the metal where you want it.

In impacts, as well as forgings, castings, extrusions and screw machine parts . . . Alcoa puts the metal where you want it. A call to Alcoa can mean fewer rejects or ingenious design solutions. Start now, write for Alcoa Up-To-Daters, a file of design tips on Alcoa Engineered Products. Aluminum Company of America, 928 Alcoa Building, Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value



Alcoa puts the metal where you want it in castings, forgings, extrusions, screw machine parts and impacts.

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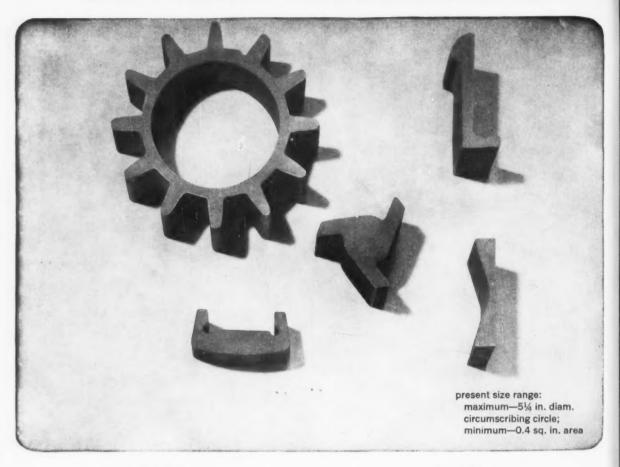
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- 316 Stainless
- 304 Stainless
- Tool Steel Atlas 93
- SAE 4130
- 410 Stainless

Why hog out intricate shapes like these? Let A-L extrude them in any steel

If you're hogging out sections, paying for special mill rolls on small orders, or waiting for minimum rolling mill tonnages, Allegheny Ludlum Steel Extrusions are your answer. They will save you scrap loss, slash your machining costs, hold down your inventory requirements and cut delivery time.

Extruded shapes save money on expensive materials and on costly machining. Non-ferrous applications in the last decade have proven it. Now even greater savings are possible with tough, strong metals in Allegheny Ludlum Steel Extrusions.

Intricate extruded shapes in all stainless grades, tool steels, carbon steels, electrical steels, high temperature alloys, even zirconium and nickel alloys are now in produc-

tion at Allegheny Ludlum, cutting costs in many different industries.

Costs and minimum order quantities are surprisingly low. Charge for die design is under \$200. Orders taken for as little as 40 pounds.

To learn more about the time and cost-cutting possibilities of Allegheny Ludlum Hot Steel Extrusions, send for the extrusion booklet—12-pages of design and engineering information with process and product explanation, material properties, design tips and limitations, tolerances, order instructions, etc. Or call any A-L office for technical assistance. Allegheny Ludlum Steel Corporation. Oliver Building, Pittsburgh 22, Pa. Address Dept. A-151.

ALLEGHENY LUDLUM

for warehouse delivery of Allegheny Stainless, call RYERSON

Export distribution: AIRCO INTERNATIONAL

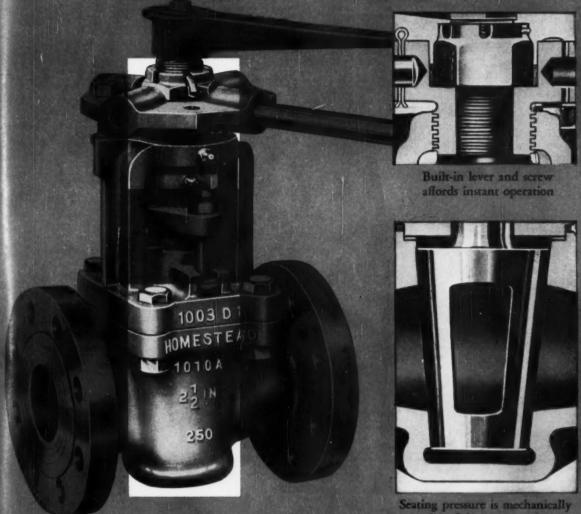
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TROUBLE-FREE SERVICE is assured under all fluid, temperature and pressure conditions by the exclusive design of Homestead Lever-Seald Valves.

Instant stick-proof operation is guaranteed by a built-in lever and screw which mechanically relieves seating pressure. This controlled relief of pressure is only sufficient to overcome friction and to permit the plug to turn freely. What's more, all operating parts are protected from the damaging effects of corrosive or erosive service conditions and are completely weatherproof.

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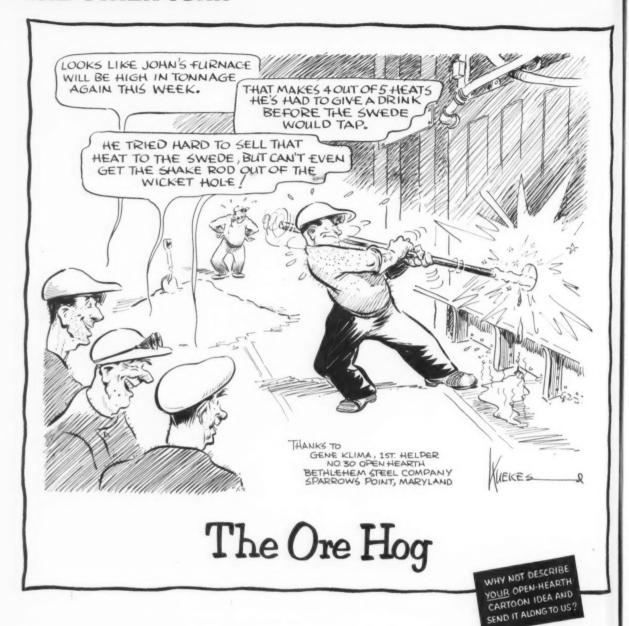
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THE OTHER TURN



The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

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- SHIPPERS WILL BENEFIT from opening of the St. Lawrence Seaway whether they plan to use the Seaway or not. Reason is that the rail-roads are mapping plans now to cut rates where necessary to meet Seaway competition.
- RULES FOR DOING BUSINESS in Venezuela will be tougher, but fair.

 That's the word from top-ranking officials of the new Betancourt regime there. The Venezuelan government is planning to diversify its industry, lessen reliance on oil. It's also welcoming trade relations with European countries as well as the United States.
- MORE STEEL COMPANIES have their eyes on that lush Midwestern market.

 Major mills are dusting off plans for new or expanded Midwestern bases. Basic oxygen vessels figure prominently in projects under consideration.
- FAVORABLE COST FIGURES on the operation of basic oxygen vessels in steelmaking are leading steel mills to consider radical replacement moves. One shop is considering oxygen vessels to replace electric furnaces built only a few years ago.
- LOOK FOR TOTAL GOVERNMENT SPENDING to climb higher in the months ahead.

 Despite Ike's economy efforts, new spending programs plus inflation are expected to balloon spending. When the smoke clears, the budget for the new fiscal year will be about 5 pct ahead of what Ike asks.
- BUSINESS IS BETTER for the makers of industrial material handling equipment. Material Handling Institute reports that January bookings ran nearly 10 pct ahead of December's.
- A MULTI-MILLION DOLLAR program to promote use of electric appliances, improved wiring and better lighting is underway. It's sponsored by Edison Electric Institute. Independent electric companies are expected to spend \$10 million on the program.
- INTERCITY TRUCK TONNAGE BUSINESS BAROMETER is still running ahead of last year. American Trucking Assn. reports such tonnage in the week ended March 14 was nearly 15 pct ahead of the same week in 1958.
- ALUMINUM HAS MADE A BREAKTHROUGH in the typewriter field. A leading typewriter maker is using substantial quantities in operating parts of its machines. Major advantages are weight saving, easier machine operation, and fabrication savings. This is a first for aluminum in typewriter operating parts.

0110



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With Wheeling Steel Pipe, YOU KNOW!

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Ask your Wheeling man about Wheeling Continuous Weld Steel Pipe, both black and galvanized, as well as Wheeling's new, improved service. Wheeling Steel Corporation, Wheeling, West Virginia.

Why Wheeling Steel Pipe is First Choice!

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- · Threads smoothly, cleanly
- · Sound joints, welded or coupled
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FOURTH U. S. SEACOAST: With opening of St. Lawrence Seaway these ports have direct access to ocean.

Seaway Challenge Will Bring Railroad Rate Cuts

Even before St. Lawrence Seaway opens in April, Eastern railroads are moving to meet its competition.

Rail rate adjustments between inland and North Atlantic ports are under study.

At the start Seaway's biggest threat will be on export coal and grain, imported iron ore, chrome, and manganese.

■ Freight users will benefit from the St. Lawrence Seaway—whether they ship on it or not.

That's because railroads are moving to meet the Seaway's competition even before it opens next month. Already railroad rate experts are going over tariffs with an extra-sharp pencil.

Study, Then Reduce—The aim: Dilute the Seaway's threat by adjusting export-import tariffs between inland and North Atlantic ports. It's still too early to set up a timetable for these rail freight reductions. Much freight equalization may be delayed until actual shipping costs via the Seaway can be analyzed.

But this much is clear: The railroads are not waiting until the Seaway lures away customers.

Protect Carriers' Interest—"We watched all aspects of Seaway development from the start," says a

Pennsylvania Railroad spokesman. "Study is now underway for prompt rate action wherever needed, when Seaway shipping costs are known. We will make any adjustments which are economically sound and in the interest of the Pennsylvania and our customers."

Another railroad, the Baltimore and Ohio, is equally determined to fight. "Our purpose," a B&O official declares, "is protecting the rail carriers' interests, not only on traffic through eastern ports, but also on freight moving via Lake ports to the Seaway. We are studying the problems of the Seaway from a freight and marketing standpoint."

Long Range Plan-Depth of the

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railroad study into potential Seaway competition is pointed out by E. V. Hill, chairman of the Traffic Executive Association — Eastern Railroads.

Says Mr. Hill: "Research staffs of the Traffic Executive Assn. and member railroads began intensive study of export-import traffic via North Atlantic ports over a year ago. As a result, we know the volume of this traffic in all important commodities. We know the extra costs involved in moving this traffic through Lake ports rather than via the North Atlantic seaboard.

"So we know—or will know—what rates we will need to keep traffic on the rails to tidewater, instead of having it diverted to the Seaway."

Hearings Next Week—Proof the railroads mean business is coming soon. Public hearings will be held next week in Chicago on proposed rail rate reductions. Suggested are cuts of about 20 pct on grain exported via North Atlantic ports. This action follows recommenda-

tions made by the traffic association committee, which proposes rates for 28 railroads.

Rates on other bulk cargo items such as coal and ore are also under study. Another analysis on general cargo rates, including tariffs on manufactured goods, will be ready soon.

Why The Hurry?—There are two important reasons why the railroads are not wasting time:

First, the Seaway's threat is real. Under present rate structures (see table) there's a great incentive for shippers to switch to the Seaway.

Second, pressure is already coming from freight users. Here's how one Ohio area importer of chrome ore reacted when sounded out by freight agents for an Eastern railroad: "Right now I ship ore from the Eastern seaboard to my plant for \$6.50 a ton. When the Seaway opens I believe I can use it and transport from the Great Lakes at a cost of \$4.50 a ton. What can you do to meet this rate?"

Where Seaway Pinches - Right

now the Eastern railroads are most concerned with the Seaway's competition in two areas: (1) Export coal and grain, and (2) Imported iron ore, chrome, and manganese. But once the Seaway is established the freight battle will widen out.

"When all products which are potential users of the Seaway are added together," says Joseph D. Boylan, market research director, N. Y. Central, "it's clear Seaway traffic will be broad enough to cover almost every commodity now carried in volume by the land transportation agencies of the U. S."

In addition to products already mentioned, heavy movements of nonferrous ores and woodpulp are expected via the Seaway. Also believed vulnerable: Manufactured articles, automobiles, machinery, dairy and meat products.

How Much Will It Move?—Just how great is the Seaway's traffic potential? Estimates on total tonnage for the first year of operation vary from 30 million to almost 58 million tons. Of that total, ore shipments may be 20 to 37 million tons. The coal and coke portion of Seaway tonnage could range from 3.7 to 6 million tons, general cargo movement 6.7 to 11 million tons.

Railroads are considering other weapons than freight cuts in their battle to hold customers. They are studying such items as more liberal demurrage allowances and charges, and interchange customs between roads. Besides, the roads hope to give favorable rates to shippers who will use them all year 'round in dependable volume. Rail freight experts point out the Seaway is frozen over about four months each winter while North Atlantic ports are open all year.

The Brighter Side—Not all rail carriers regard the Seaway as an out-and-out transport competitor. Many Western roads, in fact, expect the new water route to boost their freight business. And even roads with a heavy investment on the Atlantic coast—including the B&O, N. Y. Central, and Pennsyl-

How Seaway Rates Compare

When the St. Lawrence Seaway opens next month here's how freight rates will compare on shipments to Great Lakes ports (unless railroads make reductions on hauls from the East Coast).

- Rates via Ocean and St. Lawrence Seaway.
- Rates via Ocean to New York and rail beyond.

From Liver	Liverpool		To Toledo	To Cleveland		
Hardware	(tools and electrical equipment)	35.36 76.75	34.66 70.25	34.66 64.88		
Machinery (up to 2 tons)		29.40 56.48	28.70 51.55	28.70 47.29		
(fro	m 3 to 4 tons)	37.10 64.88	36.40 59.95	36.40 55.69		
(fro	m 4 to 5 tons)	43.06 71.54	42.36 66.61	42.36 62.35		



EISENHOWER LOCK: St. Lawrence Seaway lock at Massena, N. Y., has vehicle tunnel running underneath it.

Are Seaway Toll Schedules Set to Stay?

Plenty of Protests—Toll charges recently fixed for the Seaway are probably firm, despite howls of protest from East Coast railroads and ports.

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Seaway authorities have set up the following tolls:

General cargoes—90¢ a ton, plus 4¢ a gross registered ton of vessel. Bulk cargoes—40¢ a ton, plus 4¢ a gross registered ton of vessel.

... But to No Avail—Before the ink was dry on rate cards, Seaway opponents were calling the rates "unrealistic." Originally the U. S. and Canada agreed tolls should pay for all costs over a 50-year period.

Now Canadians want a toll-free Seaway; East Coast railroads and ports want high tolls. Seaway officials tried to compromise, pleased nobody.

However, it looks like the new rates will stick, although both sides believe they won't yield costs over the long pull.

vania—are making plans to handle traffic generated by the Seaway.

Twelve railroads serving such Ohio ports as Toledo, Lorain, Cleveland, and Ashtabula recently published a promotional pamphlet, "The Railroads Are Ready for the Seaway." It states: "A ready-made network of steel rails is available to serve . . . as the first link in the transport of goods for export via the Seaway, and the final link for movement of import goods from Seaway ports to inland destinations."

Ready for Business—These railroads say they are ready to handle a 100 pct increase in iron ore and coal traffic through Lake Erie ports. They have invested over \$30 million in the last ten years to better equip coal and ore docks.

Latest of these improvements is a new coal-loading dock put in at Toledo last year by the Chesapeake and Ohio. Capable of handling 6000 tons of coal an hour, it's expected to increase the C&O's coalloading capacity at the port by 40 pct.

Existing ore facilities at Ohio ports are easily capable of processing increased shipments through the Seaway. Ore unloaded at all Ohio ports during 1957 was 32 million tons, against a capacity at ore docks of 84 million tons.

Tracing Ore Flow—The Pennsylvania Railroad points out it handled about the same amount of iron ore in 1958 through Lake ports as it did through Atlantic ports—10 million tons.

"We have large and efficiently manned docks at Cleveland, Astabula, and Erie," says a Pennsylvania freight man. "They have ample capacity for the Seaway traffic predicted for the immediate future. And we are exploring the need for improvments to meet any later increase in volume."

The broad pattern of ore shipments to the eastern U. S. is traced this way by the Pennsy: African and South American ore will probably continue to move through Atlantic ports. The vessels in use are too long for operation through the Seaway. Some movement of Labrador ore will eventually shift to the Lake ports. Increased transport of Canadian ore through the Lakes is also expected.

Atlantic Ports Not Worried—
Atlantic Coast port authorities agree with the railroads that two types of bulk cargo—ore and grain—are the most logical candidates for Seaway transport at the start.

But ports like Baltimore are not particularly worried by the Seaway. Port men there, where almost 16 million tons of ore were handled in '57, are confident they can hold their own.

Will Steel Labor Pull a Strike?

David J. McDonald, president of the United Steelworkers of America, contends that if there is a steel strike this year it will be one "forced" on the union by the steel companies. That, of course, is strictly a play on words by an old hand at putting the steel companies on the spot.

At any rate, here's what Mr. Mc-Donald has to say on the subject: "Let's set the record straight on this strike talk at the outset. I have said for publication—and I repeat it here—that the United Steelworkers of America do not want a strike. We have never in our history sought a strike. We never shall.

"I charge now that strike talk is fomented only by indusry. No steelworker has ever expressed a desire to strike. But no steelworker has ever displayed fear of a strike, if a suspension of work was the only recourse left for the fair and honorable agreement we seek."

Those words, "fair and honorable agreement," are the nub of the matter. Mr. McDonald's definition of "fair and honorable" usually does not quite agree with the steel companies' definition of the same term.

McDonald Sounds Off on Issues

Steel labor chief is worried most about continuing unemployment despite better steel business.

He reiterates "no contract no work" policy of union but refuses to rule out the possibility of contract extension.

• "If this keeps up, there won't be much left to talk about around the bargaining table."

That's the way it seems to at least one observer of the steel labor scene. And not without some reason. Actually, there will be plenty to talk over when steel contract negotiations open in May.

Plenty of Talk—But meanwhile it seems that the United Steelworkers and the steel industry are doing a good job of airing the issues, and probable issues, well in advance of contract talks.

Last week, David J. McDonald, president of the United Steelworkers of America, used the District 4 convention of his union in New York to sound off on some of the

1959's Union-Management Crisis

gripes he now has against the steel companies.

Unemployment Problem — The thing that worries him most is unemployment in steel. Trouble is the problem has him stymied for the moment. He recognizes that the shorter work week would be extremely costly to the steel companies. Apparently he intends to press his "extended vacation" plan under which each worker would receive a three-month paid holiday for every five years worked. He puts the cost at 12¢ an hour.

At the same time, Mr. McDonald accuses the steel companies of indifference toward the plight of the unemployed steel worker. But he professes to concede the right of steel management to increase plant efficiency by introducing new machines and equipment.

Close - Mouthed on Demand— The steel union president will not discuss specific demands until his Wage-Policy Committee drafts formal recommendations. But neither Mr. McDonald nor his advisers have ever failed to come up with substantial demands on the industry. This year will be no exception.

On the question of whether the steel workers will strike in the absence of a settlement at the contract deadline on June 30, Mr. McDonald reiterated his union's traditional policy of "no contract—no work." But he also refused to rule out the possibility of a contract extension.

Foreign Steel Issue—The labor chief accuses the steel companies of using the threat of foreign competition as a propaganda piece to come between the steel worker and his union. Steel companies argue that high wage and fringe benefits make it possible for foreign mills to undersell domestic producers and thus cost steel workers jobs.

Lakes Ore Fleet Gets Up Steam

Late Thaw, Steel Strike May Cut Busy Season Short

In a few weeks, ore carriers will be making knots to beat the July 1 strike deadline.

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If stoppage occurs, next winter's ore supply may be hurt.

—By T. M. Rohan.

• Just about every Great Lakes ore carrier available will be pressed into service at season's opening this year as shippers get ready for an early rush.

Steel production is going up and ore demand with it. But staring shippers in the face is the prospect of a lengthy steel strike at the height of the shipping season which also ties up the boats.) And ice conditions in the upper lakes are the worst in years so a delayed opening is unavoidable.

No Price Changes— This will also be the first year of the St. Lawrence Seaway which will bring in foreign ore on large ocean vessels (See Special Report, p. 93).

Outlook is for about a 75 million ton year in the Lake Superior district. This is a far cry from the 52.8 million of 1958, the worst since 1939.

Lake Superior district prices will remain unchanged this season for the third straight year. But according to Cleveland-Cliffs Iron Co., prices "are subject to review later in the season." Much depends on the steel labor settlement and the impact of foreign ores.

Ore shippers have been absorbing increased labor and freight costs since the 1957 season.

Fast Delivery Wanted—"Almost all our customers want most of their ore delivered by June 30," said one prominent official last week. "We are going to get all the boats out in full strength to meet the rush. If some are not ready, we will charter others to fill the gap."

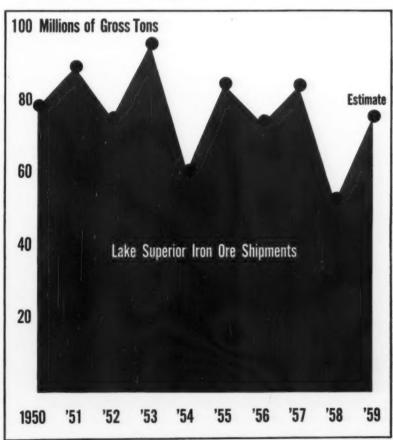
The major factor in the expected upsurge this year is, of course, the pick-up in the parent steel industry. Iron ore consumption has increased as blast furnaces are pushed to their limits by beneficiation. In addition, high ratio hot metal charges are being used in open-hearths in connection with use of oxygen and to cut scrap consumption.

Shortage Next Winter? — Total consumption of iron ore in January alone, this year, was 10.3 million tons compared to 8 million a year ago. And steelmaking has bounded up since January. Stocks on hand, are ample for the near future.

But ore shippers are concerned about a continued high steel market in the fourth quarter and through the first quarter of next year, all of which must be piled up this summer. Ore stocks on hand at the end of January were 61.6 million tons compared to 61.9 million a year ago.

Foreign Ore Debut—Ice conditions this year are so bad that boats will probably be delayed to at least April 15 compared to normally two weeks earlier. Zero weather was still hanging on last week in the Duluth area and deep blue ice is piled up.

1959 Ore Shipments Snap Back



Venezuela Wants to Diversify

It Seeks to Lessen Dependence on Oil Industry

For U. S. business, the rules will be tougher, but fair.

New president is working on long-range plans to stabilize economy.—By Tom Campbell.

• American businessmen can now come off the "sidelines" in Venezuela. The extreme anti-North American feeling has about sputtered out. Last week President Betancourt refused to be stampeded into any hasty or ill-advised statements about Venezuela-U.S.A. relations.

Venezuelan news reporters at Mr. Betancourt's first (of regular weekly) news conferences attempted to get him to make a strong statement as a result of the U.S.A. oil import quotas. They failed in the attempt. It was President Betancourt's idea that future negotiations with the U.S.A. would result in adequate solutions to any trade disagreements or misunderstandings.

The Tax Hassle—The bad taste of the recent income tax increase in Venezuela still remains with North American concerns doing business there. A check of North Americans there indicated that while they did not like the increase they found more fault with the manner in which it was instituted. Privately they realize that the former Junta, for internal political reasons, suddenly promulgated the tax increase

prior to Mr. Betancourt's inauguration. There had been previous declarations that oil companies would be consulted before any new tax increases were made.

But Mr. Betancourt cannot be held responsible for this tax increase. Furthermore, foreigners in Caracas privately agree that no sovereign government is committed to talk to other nationals before it revises its taxes.

Let's Be Realistic—A realistic viewpoint indicates that "large" profits by foreign companies in Venezuela have seen their last day. While the present administration there agrees that a fair (and by North American standards, large) return on capital investment should be allowed, such profits will come under continual scrutiny by the Venezuelan government. Repeated checks by this writer failed to find any evidence that Mr. Betancourt's administration was "out to get" foreign companies or that any action would be taken to scare foreign investment from the country.

It seems certain that what the Venezuelan government does in its effort to create work and restore an economic balance for the country will not be in the nature of luxurious or non-practical projects. Money will be raised and spent for those long-term projects, the goal of which will be to free Venezuela from its complete dependence upon oil revenues.

A Long-Term Look—Mr. Betancourt was elected by popular demand. His responsibilities are tremendous. He personally is a most serious man and his record indicates that he is dedicated to a progress in Venezuela based on democracy. He wants first to see his country's activity diversified. And he wants this to happen quickly. It is his



NEW BOSS: Romulo Betancourt, new president of Venezuela, is making long-range plans to stabilize economy of his nation. For U. S. business, the rules will be tougher, but fair; profits will be less.

"It Takes More Than Lip Service"

Tom Campbell, Editor-in-Chief, The IRON AGE:

"If U.S.A. firms are to get in on the ground floor of the "new" Venezuela they must follow the leadership of Creole Oil Corp. and other enlightened firms by not only giving lip service to the following things but by implementing them:

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"1) Promoting Venezuelans to top positions.

"2) Making provisions for Venezuelans to participate in company ownership.

"3) Proper instruction on domestic customs and also adequate explanations of the basic facts of U.S.A. actions and beliefs in order

to avoid misunderstanding.

"4) An infinite patience to work through and with Venezuelans during their hard and painful bouts with democratic reality.

"5) A frank realization that opportunity in Venezuela will often be limited at times to a strong "Venezuela for Venezuelans" attitude. But a further realization that this will be followed by trust and confidence in all foreigners and foreign companies which want to do a normal and worthwhile business in Venezuela.

"It is now necessary for North



American business concerns to pay more attention to reports from their Venezuelan representatives in that country and it may be the time to make widespread revisions in personnel and policies."

guess that in ten to fifteen years from now great strides must have been made by the Venezuelan people in ore production, trading, greatly expanded agriculture, power, conservation of natural resources and a tremendous increase in animal husbandry.

It is believed that serious and practical plans for much of this long-term program are now shaping up within the government.

National Support—Only by such a national trend can the present democracy be sustained and mature, according to the best informed people in Venezuela. Mr. Betancourt had by last week won over all Venezuelans—except the Communists—to his long term plan to rehabilitate the country.

It now appears that education, basic public works, and worthwhile housing projects will figure prominently in this picture. Furthermore, it seems certain that the potential for a reasonably large return on foreign capital in Venezuela remains definitely in the picture. But by the same token there must be more of an effort by foreigners to

see the Venezuelan point of view rather than merely to consider that nation as a place to make "a big killing."

Venezuela Comes First—It seems pretty certain that inordinate profits will no longer be made on projects in Venezuela. It is also clear that only those projects which insure the progress of the country and the welfare of the people will be tolerated by the new government.

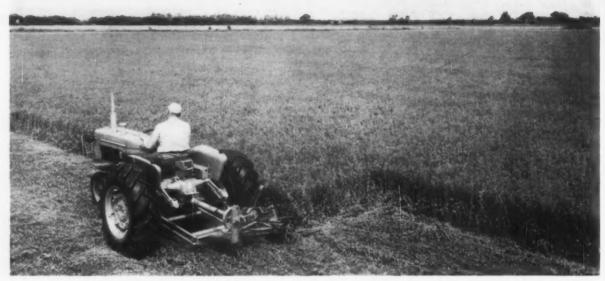
In some circles it is rather bluntly apparent that Venezuela is not by any means dependent upon North American capital for future projects. Already England, West Germany, France, and Japan are actively and extensively interested in gambling with the Venezuelans on their future.

We've Got Competition—It is safe to say that the atmosphere for free enterprise under Mr. Betancourt's administration will be as good if not better than it was under the dictatorship of Perez Jimmenez. Checking indicated that North American firms, especially U.S.A. companies which for some time have had a tremendous business in

Venezuela, must now assume that their top position is being seriously threatened by businessmen from other countries. Only those foreign firms which exhibit a basic feeling akin to Venezuelan welfare and the nation's future will "make the grade."

This does not mean that businessmen from the U.S.A. must turn into a bunch of do-gooders and must forego adequate return and profit for taking business gambles. But it does mean that those firms which do not properly screen and train their employees — and officials—who work in or visit Venezuela are in for some rude awakenings. Whether this attitude is right or wrong, it is the one that now prevails in Venezuela.

A Popular Front—Venezuela is on the march to the extent that finally its most responsible citizens and its new president are well aware that depending upon oil revenues for existence is a most dangerous policy for Venezuela. Around Mira Flores Palace—office of the government—there is a feeling of urgency not present heretofore



SALES UP: Allis-Chalmers, and all farm equipment makers, are doing 15 pct better than they had predicted.

Good Year for Farm Equipment

At the end of 1958 the industry predicted little or no change in sales this year.

Now, their third revision says business will be up about 15 pct.

—By K. W. Bennett.

■ Farm equipment sales are beating the industry's own forecast—again.

Four months ago farm equipment makers predicted they would just about hold their own in 1959. Now, their third revision looks for output of 269,000 wheeled tractors, up 15 pct over 1958.

Happy to be Wrong—Agricultural marketers guessed, in that first forecast last November, that the industry would produce about 234,000 wheeled tractors this year. Any gain could not exceed 5 pct they thought. By December dealer demand for farm equipment bounced upward and major manufacturers began boosting production schedules.

A second wave of upward re-

visions came in late January. At Mid-March, several important producers are again boosting first-half production schedules.

The wave of bitter strikes (nine weeks at International-Harvester, six weeks and still going at Allis-Chalmers) hasn't discouraged dealer demand. Some farm equipment producers are already on three shifts, some have order backlogs exceeding two months.

How it Looks—The production vice president for an important farm equipment manufacturing firm told The IRON AGE last week:

"We originally forecast a 5 pct sales drop for 1959. In December we were forced to boost production schedules 7 pct to meet dealer demand. We did it again in January, with an 8 pct boost. This month we came up again 10 pct. We're actually 25 pct ahead of our original production schedule and this level of operation looks good until May at least."

With success, comes problems.

Heavily centered in steel-tight Midwest, the farm equipment industry is already concerned over steel supplies. The industry normally carries 60 days inventory, counted on a 90 day inventory by July 1. Current inventories exceed 60 days, some running as high as 75 days. But with production still rising, it looks as if inventory building will be very difficult.

Whither Labor?—The real nightmare among farm equipment industry steel buyers is that the United Steelworkers might negotiate through July when both steelmaking and farm equipment building operations are at a low ebb. A strike called August 1, would catch the industry at the beginning of its big building season.

It is now believed that in December, the industry was 10 pct over last year's production levels, and its own forecasts. It's believed by many that it may be running over 25 pct ahead at the moment.

Suggest Ore Conveyor For Cleveland

A radically new ore conveyor system from Cleveland's lake front to three major steel mills in the city has won the support of one of its traditional opponents. The \$25-\$35 million project now goes into the economic study stage.

A hearty supporter is Pennsylvania Railroad president J. M. Symes over whose right-of-way part of the system would operate. Also in favor: H. B. Stewart, president of Riverlake Belt Conveyor Lines, Inc., for years has advocated a belt between Cleveland and the northern branch of the Ohio River to carry ore south and coal north.

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How it Would Work — The Pennsylvania Railroad would use its Lake Erie Hewlitt unloaders to handle the ore. Now it is loaded into railroad cars and switched into the mill. Or, ore boats must make a long trip up the winding Cuyahoga River to the mill sites. New St. Lawrence Seaway ships probably won't be able to get around the bends.

"This one makes sense for everyone concerned—and immediately," said Mr. Symes.

Mills which would be serviced are Republic Steel with six blast furnaces of 2.5 million tons annual capacity, Jones and Laughlin with two at 866,000 tons and American Steel and Wire Div., U. S. Steel with two totalling 752,000 tons.

Jessop Buys Warehouse

Jessop Steel Co. has acquired Steel Warehousing Corp., of Chicago, one of the largest steel service centers in the Midwest, with facilities in Chicago and nearby Broadview, Ill.

The company, which handles stainless and carbon steel products, will be a wholly-owned subsidiary of Jessop.

Frank J. Rackley, president of Jessop, said his company will spend \$2 million immediately to stock and expand the Broadview plant.

Iron Ore Project

Another huge Labrador iron ore project designed to turn out 6 million tons of iron ore concentrates annually is being proposed by Iron Ore Co. of Canada and M. A. Hanna Co., Cleveland.

The new project would be adjacent to the \$250 million Wabush

Lake project of Pickands Mather and Canadian Javelin, and rival it in size. It would be served by the same 42-mile railroad spur as Wabush Iron, and include eventually a town of 3500 persons, power plant, and allied facilities at Carol Lake, next to Wabush Lake. Ore would be unloaded at Seven Islands, Quebec.

Miniaturization Award Winner



A five-lb atomic generator developed by the Nuclear Div., The Martin Co., Baltimore, won the 1958 Miniaturization Award. Called SNAP-III, it will produce power equivalent to nickel-cadmium batteries that outweigh it 300 times.

Horace D. Gilbert, chairman of the awards committee, and president of Miniature Precision Bearing, Inc., Keene, N. H., sponsors of the award, called the winning device "a remarkable breakthrough in the field of miniaturization."

"The awards committee feels that it is a significant step toward harnessing nuclear power for peaceful purposes," he added.

Martin views its winner as more the first step than the culmination. It is now working on a 100-watt generator using the same principle. A unit about the size of a kettle drum could supply power for nearly a decade without refueling or servicing.

Others Look Good—Ten other nominees won Certificates of Excellence, including a tape recorder the size of a box of household matches and a miniature synchronous motor and gear train by Elgin Micronics.

Steel: 1958 Had Its Good Points

Shipments Hit a Post-war Low but Efficiency Was High

In several ways, last year was worse than in 1954. Still, the earnings rate was good.

Poor return on investment reflected the drag of idle equipment.—By G. J. McManus.

■ Steel mills in 1958 showed a better-than-average return on sales despite the worst steel slump of the postwar era. Shipments, ingot production and operating rates hit a postwar low.

The IRON AGE financial analysis of the steel industry reveals that last year was much worse than 1954. Shipments fell short of the 1954 mark by more than 3 million tons. Operating rates averaged 10 points under 1954. The ingot percentage was less than in any year since 1939.

Good Earnings Rate — Despite this, the industry earned 6.5 pct on sales. This compares with 6 pct in 1954 and 5.7 pct in the 17-year period ending with 1956.

If these figures indicate a new efficiency for steel, they do not mean an absence of problems. By every significant standard earnings dropped sharply from 1957. The drag of idle capacity showed up most painfully in return on investment, which dropped nearly 35 pct from 1957.

Poor Investment Return — The 1958 investment return of 6.6 pct was well under the 1954 figure of 7.3 pct. It compares even more unfavorably with 17-year averages of 10 pct for steel and 13 pct for all manufacturing.

Steelmakers argue that their investment disadvantage is even more severe when the current value of equipment is considered. Because of the long service life of a steel mill, the contention is that investment margins are overstated in an inflationary period.

Tight on Cash—In any case, the industry clearly faced a cash squeeze in 1958. On the one hand its earnings dropped 30.8 pct. At

the same time cash generated by depreciation dropped 12 pct.

Had depreciation remained at the 1957 level, steel producers would have earned roughly \$40 million less last year but would have actually retained \$40 million more

Problems Vary — The problem varies with individual companies. U. S. Steel had a drop of \$70 million in depreciation charges last year. Of this amount \$58 million represented expiration of fast tax

See Financial Analysis, facing P. 104

privileges. The drop left the Corporation with a depreciation allowance of \$205 million. This amounts to about 46 pct of U. S. Steel's capital expenditures in 1958.

In the 10 years ending 1956, the Corporation spent \$3 billion on plant and equipment. Of this amount \$1.9 billion, or 66 pct, came from depreciation.

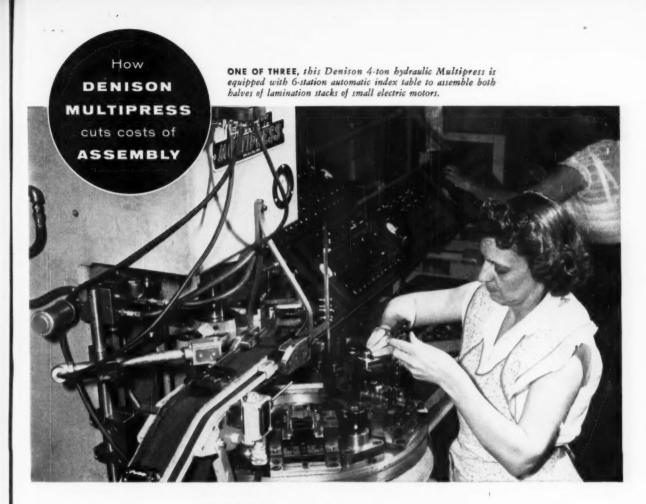
High Investment—The depreciation deficit is being filled with reinvested earnings and outside financing. In 1957 reinvested dollars totaled 45 pct of capital expenditures for U. S. Steel. In the 1946-56 period, only 22 pct of the spending dollar came from reinvested earnings. Despite a sharp drop in earnings last year, the Corporation reinvested \$114.7 million, or nearly 26 pct of capital outlay. Funded debt of U. S. Steel doubled in 1958.

Net earnings of Jones & Laughlin Steel Corp. fell 49 pct last year. However, depreciation increased 8.6 pct. As a result cash flow dropped only 24 pct.

1958 Steel Earnings – The Top Twelve

Net income of 12 steel companies rated in order of reported 1958 profits, with pct of change from 1957.

COMPANY	1958	1957	PCT CHANGE	
U. S. Steel Corp.	\$301,558,231	\$419,406,956	-28.1	
Bethlehem Steel Corp.	137,741,946	191,025,933	-27.9	
Republic Steel Corp.	61,921,680	85,014,422	-27.2	
Armco Steel Corp.	57,512,151	68,297,928	-15.8	
Inland Steel Co.	47,869,042	58,876,875	-18.7	
National Steel Corp.	35,827,414	45,518,884	-21.3	
Jones & Laughlin Steel Corp.	23,198,000	45,452,000	-49.0	
Youngstown Sheet & Tube	21,501,320	42,508,579	-49.4	
McLouth Steel Corp.	9,998,374	9,409,977	+ 6.3	
Granite City Steel Co.	9,373,580	9,984,451	- 6.1	
Wheeling Steel Corp.	8,899,267	12,077,696	-26.3	
Keystone Steel & Wire Co.	6,736,519	6,498,163	+ 3.7	



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...line of 3 new hydraulic presses simplifies and speeds small motor assemblies

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Operating in a line and connected by conveyor belts, these three hydraulic presses handle—on a semi-automatic basis—such operations as bending, staking, aligning, compressing, riveting and stamping in the production and assembly of small electric motors.

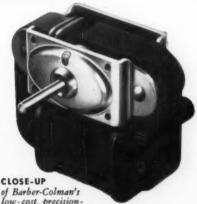
In addition to more efficient handling of production functions, the quality of output is more uniform because exact pressure is duplicated on each stroke of the hydraulic ram.

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FAMED MULTI-POINT MECHANICAL SLEEVE CLUTCH

Picks up load on 14 engaging jaws. Applins driving farce concentrically without keys or pins. Assures instantengagement and maximum productive strokes per minute. Needs no air nor electricity. Practically no maintenance. Greater safety: Simplified controls, fewer parts to wear out. Yes, it permits, inching, too.

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Here's a workhorse that's known for setting the pace on the most demanding jobs...jobs where the clutch is engaged and disengaged at every press stroke... jobs that call for operation three shifts a day, day in and day out. D

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Built and backed by a company which produces industry's greatest variety of inclinables*, Series A Presses have amassed an unusual success record in thousands of applications. To be specific, let's take a close look at a Series A user:

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28 OBI'S SINGLE STROKED 707,140,000 TIMES
WITHOUT ONE CENT SPENT ON CLUTCH ENGAGING SURFACES

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COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Depreciation, Depletion and Amortization	for Federal Income	Net Income ⁶
U. S. Steel Corp.	. 1958 1957	40,212,000 39,582,000	23,818,889 33,737,735	59.23% 85.2	16,992,305 23,414,070	\$3,472,177,091 4,413,806,173	\$204,899,055 276,008,777	\$285,000,000 406,000,000	\$301,558,231 419,406,956
Bethlehem Steel Corp		23,000,000 20,500,000	13,393,034 19,123,201	58.2 93.3	9,686,228 13,535,705	2,024,282,732 2,624,913,123	108,655,366 110,656,878	131,000,000 175,000,000	137,741,946 191,025,933
Republic Steel Corp.	1958 1957	12,242,000 11,047,000	6,430,283 8,484,615	52.5 76.8	4,463,595 6,211,485	910,382,817 1,227,257,507	33,074,198 40,787,933	60,500,000 89,600,000	61,921,680 85,014,422
Jones & Laughlin Steel Corp	. 1958 1957	7,500,000 6,900,000 ²	4,947,000 6,048,000	66 88	3,357,000 4,272,000	654,060,000 837,568,000	48,038,000 44,227,000	18,090,000 39,901,000	23,198,000 45,452,000
National Steel Corp	. 1958 1957	6,800,000 6,200,000	4,476,000 5,326,000	66 86		539,957,294 640,967,342	39,350,724 46,266,264	35,000,000 43,550,000	35,827,414 45,518,884
Youngstown Sheet & Tube Co	. 1958 1957	6,500,000 6,240,000	3,659,482 5,137,834	56.3 82.3	2,542,714 3,593,375	506,959,574 688,611,592	29,662,816 40,337,908	20,170,000 39,488,000	21,501,320 42,508,579
Armco Steel Corp. ²	. 1958 1957	6,394,200 6,000,200	4,506,127 5,423,592	70.5 90.4	3,640,620 4,453,017	867,390,909 1,073,705,249	34,456,960 38,430,193	55,860,180 69,039,571	57.512,151 68.297,928
Inland Steel Co	. 1958 1957	5,800,000 5,500,000	4,714,904 5,502,707	81.3 100.0	3,384,209 4,041,130	661,253,596 772,380,683	29,752,455 25,985,912	42,440,000 60,555,000	47,849,042 58,76,875
The Colorado Fuel & Iron Corp	.1958 1957	2,836,500 2,799,500	1,706,308 2,163,594	60.16 77.29	1,355,084 1,796,461 ⁴	276,163,902 340,755,160	13,176,766 11,703,979	2,468,500 14,926,000	2.117,223 14.136,851
heeling Steel Corp.	.1958 1957	2,400,000 2,200,000	1,580,214 1,828,534	65.8 83.1	1,119,363 1,428,788	221,009,355 249,756,955	14,697,131 15,369,129	6,954,000 10,116,000	8 19,267 12 7,696
S aron Steel Corp	. 1958 1957	1,989,000 ⁷ 1,898,000	779,281 1,204,283	39.78 63.45	517,277 856,503	99,970,977 151,651,824	3,678,381 4,038,504	190,000 3,606,000	4,942
:Louth Steel Corp		1,574,000 1,574,000	1,396,103 1,534,240	88.70 97.47	1,047,029 1,122,335	171,590,704 179,759,232	13,588,974 12,604,788	2,430,000 5,562,000	8,374
iser Steel Corp.9		1,536,000 1,536,000	1,466,278 1,590,322	95.5 103.5	940,500 1,043,620	181,385,288 208,619,403	17,825,807 15,879,598	2,175,000 9,300,000	2,271
troit Steel Corp		1,500,000 1,500,000	447,613 562,477	30 37	386,093 480,911	61,781,666 82,543,525	4,726,999 4,674,552	1,250,000 3,346,000	3,692 4,382
ucible Steel Co. of America		1,424,530 1,423,400	710,823 926,209	49.9 65.1	459,311 683,970	186,363,233 235,938,306	9,248,738 11,039,847	2,315,000 5,630,000	4,793
tsburgh Steel Co		1,416,000 ¹⁰ 1,320,000		61.3 86.4	725,653 1,018,756	134,475,314 183,260,331	7,705,900 6,756,677	1,418,000 1,516,000	5,593 5,000
anite City Steel Company	. 1958 1957	1,200,000 1,200,000	1,106,556 1,116,698	87.8° 93.1	879,500 894,052	125,272,603 123,763,490	4,953,639 4,868,875	10,127,000 ¹³ 10,829,000 ¹³	3,580
egheny Ludlum Steel Corp	. 1958 1957	864,200 864,200	418,254 495,280	48.4 57.3	270,213 352,989	202,572,808 267,647,586	9,628,709 11,006,453	6,174,000 13,441,000	4.803
rium Steel Corp.18	1958 1957	846,760 846,760	226,110 585,993	26.70 69.20		27,614,634 83,885,112	2,208,478 2,606,506	2,185,396 3,536,000	.545 02,9 98
orthwestern Steel & Wire Corp.	.1958 1957	825,000 825,000	473,561 703,752	57.4 85.3	380,518 548,419	60,468,595 78,105,122	2,241,295 1,791,594	5,840,000 6,030,000	49,890 - 25,418
an Wood Steel Company	. 1958 1957	800,000 800,000	505,341 655,536	63.17 81.94	335,571 437,819	54,163,265 67,889,893	3,822,587 4,136,775	997,000 1,047,000	
ukens Steel Co.	. 1958 1957	750,000 750,000	602,996 758,212	80.4 101.1	404,770 566,521	99,256,110 130,473,207	2,114,125 1,805,708	4,255,000 11,687,000	4,181,986 10,119,998
Copperweld Steel Co	. 1958 1957	660,000 660,000				93,526,153 121,094,351	2,934,751 2,610,111	2,175,000 2,500,000	2,081,114 2,769,855
one Star Steel Co.17	. 1958 1957	660,000 550,000	384,475 666,853	58.3 121.2	192,000 455,000	45,804,182 95,340,258	4,693,713 4,074,634	None 6,557,000	1,064,697
Acme Steel Co.22	. 1958 1957	608,000 608,000	329,716 383,552	*******	557,250 664,279	128,817,000 147,749,000	3,401,000 3,409,000	5,113,000 6,186,000	5,307,000 6,017,000
aclede Steel Co	. 1958 1957	600,000 520,000	454,693 452,005	75.7 86.9	350,324 352,526	63,159,247 62,226,543	1,497,801 1,403,965	4,075,000 4,675,000	3,704,251 3,838,646
Keystone Steel & Wire Co		450,000 450,000	366,793 395,236	81.51 87.83	291,734 290,354	61,198,258 59,739,437	1,170,204 1,251,605	6,992,003 6,393,924	6,736,519 6,498,163
Continental Steel Corp. 18	. 1958 1957	420,000 420,000	308,248 338,508	73.4 80.6	253,835 231,880	46,798,182 42,657,749	1,353,381 1,328,034	4,400,000 3,130,000	3,887,634 2,756,655
Atlantic Steel Co	.1958 1957	400,000	146,643 229,807	36.6 57.45	129,046 175,453	22,083,434 28,115,864	658,207 843,951	241,000 327,000	353,235 348,182
GRAND TOTAL	1958 1957	132,208,190 125,224,060	79,700,000 ²⁰ 105,500,000 ²⁰ -24.5	$ \begin{array}{r} 60.6^{21} \\ 84.5^{21} \\ -28.2 \end{array} $	56,800,00020	\$11,999,934,892 \$15,111,197,017 -20.6	\$653,216,160 \$745,905,204 \$-12.4	\$712,590,287	\$766,112,120

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After allowance for preferred stock.
 Includes 300,000 tons transferred 4/30/57 from Rotary Electric.
 1957 restated to include National Supply Co.
 Exclude nonferrous shipments.
 2 pet stock dividend 1958.

^{6.} Italics indicate loss.
7. Includes 91,000 tons added May 1, 1958.
8. Includes \$1,825,000 credit from prior years.
9. Preferred stock includes 200,000 shares 5¾ pct convertible preference stock issued 1958 par value \$20,000,000—1958 dividends \$720,295 included in

figures.

1. Increased to 1,560,000 April 1, 1958.

1. Stock dividend of 61,846 shares in 1957.

12. Granite City—includes \$197,000 net, in 1958 and \$2,388,000 in 1957 of current income tax savings.

13. Barium—1958 figures give effect to 1 for 4 reverse

ITY OF THE UNITED STATES AS OF JANUARY 1, 1958

Depreciation Depletion and Amortization	for Federal Income	Net Income ⁶	Net Income Percent of Sales	Number of Common Shares Outstanding	Earnings Per Common Share	Common Dividends Declared	Number of Preferred Shares Outstanding	Preferred Dividends Declared	Funded Debt	Preferr Stock
\$204,899,055	\$285,000,000	\$301,558,231	8.7%	53,828,122	\$5.13 ¹	\$161,413,701	3,602,811	\$25,219,677	\$487,565,195	\$360,281,
276,008,777	406,000,000	419,406,956	9.5	53,753,622	7.33 ¹	161,240,991	3,602,811	25,219,677	216,547,272	360,281,
108,655,366	131,000,000	137,741,946	6.8	45,087,548	2.91	107,516,143	933,887	6,537,209	159,883,500	93,388,
110,656,878	175,000,000	191,025,933	7.3	44,644,188	4.13	105,298,459	933,887	6,537,209	171,212,500	93,388,
33,074,198 40,787,933	60,500,000 89,600,000	61,921,680 85,014,422	6.8	15,635,759 15,595,101	3.96 5.45	46,857,976 46,704,184			98,158,550 75,983,700	
48,038,000	18,090,000	23,198,000	3.6	7,796,354	2.79	19,477,000	293,568	$1,468,000 \\ 1,468,000$	143,287,000	29,357,0
44,227,000	39,901,000	45,452,000	5.4	7,785,316	5.65	18,635,000	293,568		135,071,000	29,357,0
39,350,724	35,000,000	35,827,414	6.64	7,466,281	4.80	22,298,906	None	None	112,076,555	None
46,266,264	43,550,000	45,518,884	7.10	7,425,622	6.13	29,667,767	None	None	111,790,998	
29,662,816 40,337,908	20,170,000 39,488,000	21,501,320 42,508,579	4.3 6.3	3,452,598 3,441,648	6.23 12.35	17,245,921 17,188,171	None None	None None	112,250,000 95,500,000	None
34,456,960 38,430,193	55,860,180 69,039,571	57,512,151 68,297,928	6.63	14,783,537 14,494,742	3.89 4.71	44,203,330 43,003,052			107,056,000 114,291,000	
29,752,455 25,985,912	42,440,000 60,555,000	47,869,042 58,876,875	7.3 7.7	5,755,921 5,692,763	8.32 10.34	25,807,987 25,499,249			171,410,000 175,814,900	
13,176,766 11,703,979	2,468,500 14,926,000	2,147,223 14,236,851	.78 4.18	3,452,153 3,384,463	$\frac{.47}{4.04}$	6,767,871	179,539 195,553	525,650 557,402	49,708,000 51,937,000	8,977,7 9,778,7
14,697,131	6,954,000	8,899,267	4.03	1,936,677	3.69	3,873,324	347,580	1,751,878	39,032,800	34,758,0
15,369,129	10,116,000	12,077,696	4.84	1,936,653	5.32	6,584,312	352,306	1,768,017	41,469,900	35,230,0
3,678,381 4,038,504	190,000 3,606,000	224,942 4,046,773	$\frac{0.22}{2.67}$	1,102,501 1,100,000	0.20 3.68	880,515 3,300,000	None None	None None	11,800,000 13,200,000	None
13,588,974 12,604,788	2,430,000 5,562,000	9,998,374 9,409,977	5.83 5.23	1,489,130 $1,487,000$	5.65 5,37		481,810 539,722	1,590,197 1,432,129	75,546,000 70,913,000	25,745,1 29,389,5
17,825,807	2,175,000	5,422,271 ⁸	3.0	3,264,462	.76	1,299,800	1,683,585	2,941,900	243,933,293	57,089,6
15,879,598	9,300,000	21,438,507	10.3	3,249,500	5.91	1,299,800	1,515,015	2,229,496	229,515,123	37,875,3
4,726,999	1,250,000	1,153,692	1.9	3,012,423	0.31 0.90	1,506,211	36,000	216,000	22,000,000	3,600,0
4,674,552	3,346,000	3,004,382	3.6	3,021,832		3,021,832	45,000	270,000	24,000,000	4,050,0
9,248,738 11,039,847	2,315,000 5,630,000	4,274,793 6,543,594	2.3 2.8	3,793,586 3,791,486	1.13 1.75	1,896,793 6,066,377			23,472,000 25,018,772	*******
7,705,900	1,418,000	865,593	.65	1,585,890	1.37	1,546,10511	241,943	1,308,148	31,000,000	24,194,3
6,756,677	1,516,000	4,155,000	2.28	1,585,890	1.80		241,943	1,308,150	33,002,895	24,194,3
4,953,639	10,127,000 ¹³		7.5	2,129,549	4.36	3,405,083	16,073	93,331	37,291,000	1,607,3
4,868,875	10,829,000 ¹³		8.1	2,127,717	4.64	6,382,015	19,658	112,812	37,800,000	1,965,8
9,628,709 11,006,453	$6,174,000 \\ 13,441,000$	5,844,803 11,651,851	2.89 4.35	3,856,008 3,852,790	1.52 3,02	7,707,707 7,688,196			36,124,200 37,936,200	*******
2,208,478	2,185,396	1,966,545	7.12	1,037,241	1,90	None	None	None	9,527,141	None
2,606,506	3,536,000	3,062,998	3.65	4,149,495	. 74	2,102,30414	None	None	10,113,000	
2,241,295	5,840,000	5,049,890	8.4	2,502,113	2.02	1,251,056	None	None	7,245,561	None
1,791,594	6,030,000	5,225,418	6.7	2,502,113	2.09	1,991,932	None	None	7,865,055	None
3,822,587	997,000	2,109,203	3.89	696,007	2.68	487,205	48,398	241,990	4,537,052	4,839,8
4,136,775	1,047,000	2,054,046	3.03	696,007	2.60	974,410	48,398	241,990	6,020,000	4,839,8
2,114,125 1,805,708	4,255,000 11,687,000	4,181,986 10,119,998	4.2 7.8	953,928 953,928	$\frac{4.38}{10.61}$	1,907,856 3,243,355	None None	None None	20,500,000 2,050,000	None
2,934,751	2,175,000	2,081,114	2.2 2.3	1,101,889	1.76	1,092,835	45,306	138,356	11,525,485	2,265,3
2,610,111	2,500,000	2,769,855		1,086,191	2.41	2,034,079	48,919	156,046	11,979,667	2,445,9
4,693,713 4,074,634	None 6,557,000	1,064,697 11,329,508	2.0 12.0	3,206,300 3,194,400	.33 3.55	(16) (16)			50,176,099 54,800,000	
3,401,000 3,409,000	5,113,000 6,186,000	5,307,000 6,017,000	4.12 4.07	2,768,669 2,504,103	1.89 2.40	2,768,669 5,008,206	53,000	25,440	22,000,000 22,000,000	5,300,6
1,497,801	4,075,000	3,704,251	5.86	206,250	17.96	1,650,000	None	None	3,800,000	None
1,403,965	4,675,000	3,838,646	6.17	206,250	18.61	1,650,000	None	None	4,000,000	
1,170,204	6,992,003	6,736,519	11.01	1,875,000	3.59	3,750,000	None	None	None	None
1,251,605	6,393,924	6,498,163	10.88	1,875,000	3.47	3,750,000	None	None	None	
1,353,381	4,400,000	3,887,634	8.31	516,401	7.53	1,807,403	None	None	1,800,000	None
1,328,034	3,130,000	2,756,655	6.46	516,401	5.34	1,002,722 ¹⁰	None	None	2,000,000	
658,207	241,000	353,235	1.60	396,500	0.77	None	6,571	45,997	None	700,6
843,951	327,000	348,182	1.24	396,500	0.76	198,250	6,571	45,997	None	700,6
\$653,216,160	\$712,590,287	\$766,112,120	6.5	211,564,097	\$3.62	\$481,691,308	7,970,071	\$42,103,773	\$2,092,705,431	\$655,704,6
\$745,905,204	\$1,053,474,495	\$1,106,671,128	7.3	195,740,202	\$5.65	\$511,848,639	7,435,351		\$1,781,831,982	\$633,496,9
-12.4	-32.4	-30.8	-10.9	+8.1	-35.9	-5.9	+1.6		+17.4	+3.5

figures.
Increased to 1,560,000 April 1, 1958.
Stock dividend of 61,846 shares in 1957.
Granite City—includes \$197,000 net, in 1958 and \$2,388,000 in 1957 of current income tax savings.
Barium—1958 figures give effect to 1 for 4 reverse

split of common stock May 9, 1958.

14. Barium—includes stock dividend of \$879,934—2 pct.

15. Northwestern—all data for fiscal year ending July 31 on consolidated to include wholly owned subsidiaries.

 ^{16. 10} pct stock dividend each year.
 17. Lone Star—common shares, common stock surplus adjusted for stock dividends.
 18. Capital in excess of par \$270,455.
 19. Continental—plus 2 pct stock dividend 12/20/57.
 20. Estimated based on national operating rate.

THE IRON AGE STEEL INDUSTRY FINANCIAL **ANALYSIS 1958-1957**

S 7 V Z d V U Z V Z L Y B S n q Z 7 E E S

	n (1	6		Invested.	3371-1-4	Income		ANALYSIS 1958-195
	Preferred Stock	Common Stock	Surplus	Invested Capital	Working Capital	Percent of Investment	Year	COMPANY
	\$360,281,100 360,281,100	\$897,135,367 895,893,700	\$1,856,569,230 1,741,644,377	\$3,601,550,892 3,214,366,449	\$696,296,429 679,614,493	8.4 13.3	1958 1957	U. S. Steel Corp.
	93,388,700 93,388,700	540,734,955 524,594,305	992,497,965 968,809,371	1,786,505,120 1,758,004,876	700,321,744 676,689,252	8.1% 11.3	1958 1957	Bethlehem Steel Corp.
		156,462,211 156,055,631	556,853,360 541,151,244	811,474,121 773,190,575	245,895,793 212,213,811	8.0 11.2	1958 1957	Republic Steel Corp.
	29,357,000 29,357,000	77,482,000 77,490,000	408,254,000 405,776,000	658,380,000 617,694,000	153,120,000 142,969,000	4.2 7.8	1958 1957	Jones & Laughlin Steel Corp.
6	None None	74,662,810 74,256,220	380,277,235 365,123,825	566,889,286 551,004,815	137,287,541 118,154,844	6.6 8.6	1958 1957	National Steel Corp.
	None None	111,173,885 110,624,638	329,976,887 325,721,488	553,400,772 531,846,126	227,619,115 200,886,825	4.6 8.8	1958 1957	Youngstown Sheet & Tube Co.
		147,835,367 144,947,423	489,580,922 466,657,233	744,472,289 725,895,656	340,971,865 298,924,416	8.23 9.79	1958 1957	Armco Steel Corp.
		109,945,512 105,574,831	323,445,618 301,384,563	604,801,130 582,774,294	145,933,487 186,785,479	8.9 10.95	1958 1957	Inland Steel Co.
	8,977,794 9,778,736	17,178,093 16,839,641	119,864,788 118,560,389	195,728,675 197,115,766	69,041,476 69,733,224	2.58 8.68	1958 1957	Colorado Fuel & Iron Corp.
	34,758,000 35,230,600	19,366,770 19,366,530	101,976,151 98,702,086	237,440,675 237,041,083	85,890,156 86,725,179	4.31 5.71	1958 1957	Wheeling Steel Corp.
	None None	11,085,400 11,060,390	66,679,042 67,802,573	90,264,442 92,062,963	37,300,295 38,051,019	0.85 4.83	1958 1957	Sharon Steel Corp.
0	25,745,150 29,389,550	3,722,825 3,717,500	57,550,505 49,049,716	162,564,480 153,069,766	43,924,343 36,918,415	7.40 7.18	1958 1957	McLouth Steel Corp.
3	57,089,625 37,875,375	3,264,462 3,249,500	103,682,885 102,486,518	407,970,265 373,126,516	37,985,905 61,394,801	4.3 7.7	1958 1957	Kaiser Steel Corp.
9	3,600,000 4,050,000	3,012,423 3,021,832	53,110,795 53,772,714	81,723,218 84,844,546	27,402,213 24,355,960	2.98 5.23	1958 1957	Detroit Steel Corp.
0 2		47,419,825 47,393,581	71,243,354 68,845,039	142,135,179 141,257,392	60,453,152 52,862,076	3.67 5,39	1958 1957	Crucible Steel Co. of America
5	24,194,300 24,194,300	15,858,900 15,858,900	48,966,001 51,139,742	120,019,201 124,195,837	30,868,954 32,070,254	.62 4.61	1958 1957	Pittsburgh Steel Co.
0	1,607,300 1,965,800	26,619,956 26,597,456	58,352,816 52,464,121	123,871,072 118,827,377	33,448,593 32,557,303	9.1 9.6	1958 1957	Granite City Steel Co.
0	*******	3,856,008 3,852,790	101,412,362 103,201,984	141,392,570 144,990,974	62,706,425 60,278,200	5.15 9.03	1958 1957	Allegheny Ludlum Steel Corp.
l D	None None	4,148,964 4,149,495	18,491,995 21,313,260	32,168,100 35,575,755	18,536,852 21,327,740	4.07 10.20	1958 1957	Barium Steel Corp.
5	None None	12,510,565 12,510,565	19,449,016 15,650,183	39,205,142 36,025,803	10,335,021 7,160,489	14.0 15.6	1958 1957	Northwestern Steel & Wire Corp
2	4,839,800 4,839,800	6,960,070 $6,960,070$	21,890,370 20,510,362	38,227,292 38,330,232	7,082,772 6,677,753	5.52 5.36	1958 1957	Alan Wood Steel Co.
0	None None	3,179,760 3,179,760	40,096,987 37,822,858	63,776,747 43,052,618	19,503,669 21,443,298	6.6 23.5	1958 1957	Lukens Steel Co.
5	2,265,300 2,445,950	5,509,445 5,430,955	36,765,495 35,623,754	56,065,725 55,480,326	21,644,387 21,413,518	4.74 5.90	1958 1957	Copperweld Steel Co.
		3,206,300 3,194,400	46,517,315 45,208,678	99,899,714 103,203,078	39,258,423 36,131,639	3.8 13.6	1958 1937	Lone Star Steel Co.
0	5,300,000	27,827,000 27,827,000	42,078,000 39,630,000	97,205,000 89,457,000	38,246,000 38,424,000	6.56 7.75	1958 1957	Acme Steel Co.
0	None None	4,125,000 4,125,000	24,212,753 22,158,502	32,137,753 30,283,502	16,676,214 15,103,052	12.10 13.17	1958 1957	Laclede Steel Co.
	None None	2,604,167 2,604,167	38,690,355 35,703,836	41,294,522 38,308,003	2,875,381 4,752,201	16.31 16.96	1958 1957	Keystone Steel & Wire Co.
0	None None	7,229,614 7,229,614	18,269,983 16,189,752	27,570,052 25,689,821	13,638,973 11,787,097		1958 1957	Continental Steel Corp.
	700,000 700,000	2,000,000 2,000,000	10,192,199 9,884,961	12,892,199 12,584,961	4,735,409 4,133,619		1958 1957	Atlantic Steel Co.
1 2	\$655,704,069 \$633,496,911	\$2,346,117,654 \$2,319,605,894		\$11,571,025,633 \$10,959,300,110	\$4,330,000,587 \$3,209,558,957	6.6	1958 1957	GRAND TOTAL
	+3.5	+1.1	+4.1	+5.6	+34.9	-34.7		Percent Change 1958 over 1957

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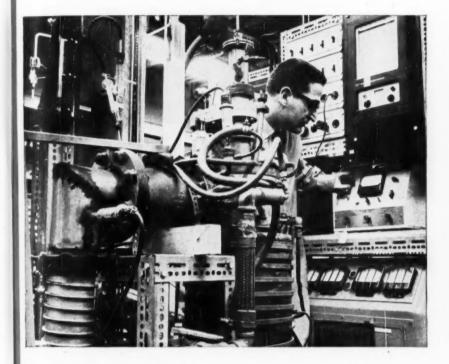
THE IRON AGE, March 26, 1959

on stock surplus ridend 12/20/57. rating rate.

^{21.} National rate for industry by AISI.
22. Include Acme Newport Steel Company.
23. Italics indicate tax credit.



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W. Roberts Wood

An Engineer Keeps Up to Date

Today, it's easy for an engineer to lose touch with the "outside world."

Mr. Wood advises technicians to extend their interests to other fields.

• How can an engineer manage to stay out of a rut?

W. Roberts Wood, president, Girdler Construction Div., Chemetron Corp., believes this is one of the most important occupational problems that an engineer must face.

Because an engineer's education is so specialized, his outlook can become narrowed and stifled if he gets too wrapped up in his work, Mr. Wood says. Most engineers are aware of this trap. The problem is, how to avoid it.

Started in Research — Although he has been with the same corporate family for close to 30 years, Mr. Wood has managed to avoid the "engineer's rut" consistently.

Two years out of Cornell University, where he earned a degree in chemistry in 1927, he took a job in his home town of Louisville, Ky., as research engineer with Girdler Corp. His first assignment was a survey to determine the potential of the then new Girbotol process for separating hydrogen sulfide and carbon dioxide from gaseous mixtures.

Outside Stimulus—Other surveys followed and eventually he became involved in construction of plants for producing of high-purity hydrogen used, among other things, in the refining and annealing of steel.

During this time, Mr. Wood was developing outside interests in his community and profession. Perhaps it acted as a stimulus. He rose steadily in the company. When



W. ROBERTS WOOD: Engineers need broad interests.

Girdler Corp. and National Cylinder Gas Co. merged in 1953 to form Chemetron Corp., Mr. Wood was elected a director and vice president of the parent corporation.

Heavy Work Load—Mr. Wood travels moderately, about 35,000 miles a year on business. He pitches in on key sales problems. When he's in town he tries to leave his work at the office at the end of a day. Often as not, he winds up involved in one of his many civic activities—such as attending the board of governors meeting at an art museum.

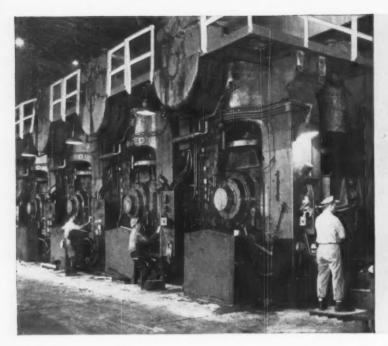
This year, he hopes to keep himself diversified by taking on added duties as president of the National Constructors Assn. and president of the Louisville Chamber of Commerce.

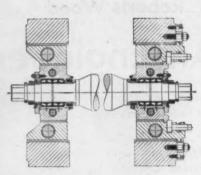
Time Out to Relax—How, you say, does he avoid ulcers? He golfs "for exercise," and is still pleased to break 100 consistently. Around Louisville, he's known as a good bridge partner, a shrewd gin rummy antagonist, and a man who's made noteworthy contributions to the advancement of the rough-and-ready game of Red Dog.

Add all these things together and you get a well-rounded, conversive engineer who is a credit to his community, his company, and to himself.

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6, 1959





UNITED ENGINEERING mounts the work roll necks on the 4-high cold rolling mill on Timken tapered roller bearings to give lower cost per ton of steel rolled.

How Weirton cold rolls steel up to 5,000 F.P.M.

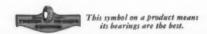
COLD rolling steel up to 5,000 F.P.M. calls for bearings with real guts. That's why United Engineering specified Timken® tapered roller bearings on the work roll necks of this 4-high tandem cold mill built for Weirton Steel Company, Division of National Steel Corporation. And to maintain gage and quality at these high speeds, they specified Timken bearings on the mill gear drives and pinion stands, tension reel, payoff reel screwdown drive, the coil transfer car, coil rotating rig and for the tilting gear drive for the coil unloader.

Timken tapered roller bearings have the high radial and thrust capacity you need for modern steel mills. They're tapered to take any combination of radial and thrust loads. And they're casecarburized to produce hard, wear-resistant surfaces over tough, shock-resistant cores. Both are reasons why Timken bearings have records in steel mills the world over.

Because Timken bearings practically eliminate

friction, cut starting resistance, they cut scrap losses to a bare minimum. Grease lubricated, they cut maintenance costs to the bone. It all adds up to lower bearing cost per ton of steel rolled . . . why Timken tapered roller bearings are on the roll necks of 1,008 mills.

Specify Timken tapered roller bearings for the next rolling mill you buy or build. They make good machines better, help turn out a better product for less money. And with Timken bearings you get the best engineering service there is. That's Better-ness. And Timken bearings are the symbol of Better-ness. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.



BETTER-ness rolls on the tapered roller bearings



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Jobs Not Tied to Business Cycle

Unemployment is no longer tied directly to the ups and down of the business cycle. Instead, regional and industrial factors are more important.

Only diversification of industry will save some areas from semi-permanent unemployment problems.

There is a growing disenchantment with unemployment compensation as the only answer to the jobless problem.

The reason: Current unemployment is not the result of a business cycle. Instead, it is a regional or industrial problem and has to be attacked on that basis.

Boom Unemployment — Many tend to forget now that the big boom of 1955-56-57 had pockets of unemployment across the country. These are now aggravated or enlarged. And they have lasted so long that most of the jobless have now exhausted their unemployment compensation.

This is not an argument against jobless pay. It is credited with easing the 1958 recession and helping keep the economy in shape for the recovery. But it is not the answer to the type of unemployment that exists today.

Good Business Not Enough— Now, the industrial centers are aware that national recovery doesn't automatically mean a return to full employment. There are other factors besides "poor business" that leave widespread unemployment.

Pointing to Michigan as a prime example of "deep and stubborn" unemployment problems, a University of Michigan economist, Prof. William Haber, points out that unemployment there is not a problem caused by the business recession.

The Causes — Instead, he puts the blame on these factors:

- 1. Major shifts in defense procurement.
- 2. Decentralization of the automobile industry.
- 3. Consolidation of smaller auto companies.
- 4. Technological change, including automation.

While Michigan serves as a

prime example, other areas may be faced with similar problems, if they are one-industry areas.

No Easy Way Out—The professor has no formula for an easy way out. Diversification of industry may be the only way, but it is a long, hard route.

But it is increasingly evident that unemployment is not a problem to be solved by jobless pay to ease a business cycle. It may prove to be the biggest economic problem facing the nation.

Production Heads for Record High

• In spite of some severe "spots" in the economy, industrial production is flirting with the record high.

The Federal Reserve Board's production index hit 144 in February. This is only two points off the all-time high of February, 1957 and one point below the immediate pre-recession point of 145 in August of that year.

Metals Lead—You have only to look at the steel and other primary metals industries to find out where the strength lies. Steel is producing at a record rate as is aluminum. That's tonnage, not pet of capacity. Other metals are doing almost as well.

At the same time, personal income jumped to an annual rate of \$364.5 billion in February, up \$1.5 billion over the previous month.

Headed for the Top—It's conceded that the metals industries are operating at inflated rates. This, of course, is largely due to strike hedging and inventory rebuilding.

With a little pickup in some of the consumer goods industries this month, it's possible that the alltime production rate may be equaled or even bettered this month.

Some businessmen are being told by their economic analysts that a rate of 150 may be reached this spring.

Behind Auto Credit Figures

It may be a surprise, but actual cash outlays for cars in disappointing 1958 were higher than in 1955, the record year for auto sales.

Because of instalment buying, consumer purchases of new cars do not represent the actual cash outlay. Purchases, of course, did hit a record in 1955.

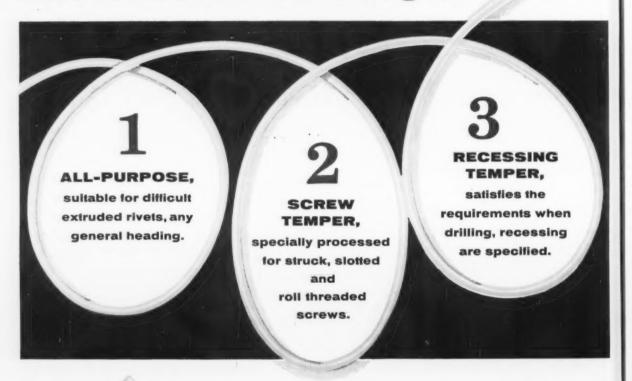
According to a study by the Mellon National Bank and Trust Co., cash outlays reached a peak of \$16.2 billion in 1957, declined to \$15.4 billion in 1958.

Car purchases reached \$18.3 billion in 1955, dropped to \$15.6 billion in 1956. Total auto purchases in 1958 reached \$14.1 billion, about the same total as 1953.

1959

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Where Does an Engine 'Belong'?

Debate Grows Over Front-Vs Rear-Mounted Models

Small cars coming out next fall bring up a controversial engineering question.

Ford and Chrysler favor a front-mounted engine; GM has it in rear.—By H. R. Neal.

By now it is pretty widely known the automotive Big Three are pushing ahead with their plans to introduce light cars in the last quarter of this year.

Ford and Chrysler each plan to introduce a car with front-mounted engine. General Motors' entry will have the power plant in the rear.

A Sales Issue—Until now, the front-vs-rear-mounted engine question has been one left largely to automotive engineers, car buffs, and the owners of the several imported makes with rear engines. But before many more months pass the question will be openly debated as each side makes its pitch for buyers. And "understeering" and "oversteering" are words that will be frequently heard.

Last week, two British engineers, A. G. Booth and B. B. Winter, of the Rootes Group, outlined before the Society of Automotive Engineers some of the reasons their company decided on a front-mounted engine for the Hillman Minx. At the same time, they may have explained what Chrysler president L. L. Colbert meant when he said Chrysler's light car would have the engine in front "where it belongs."

European Experience — They noted that in Europe, with one or two exceptions, rear mounted engines are usually confined to engine displacements of less than 61 cu in.

The light cars planned by the Big Three will all be six cylinder engines with displacements of 140 cu in, and higher.

Then, they continued, "The problem of excessive rear end weight with its undesirable influence on roadholding and steering, is likely to be aggravated further by the weight and bulk of possible transmission developments, air-conditioning, power drives and such like."

Weight and Safety Factors— There are problems in providing adequate foot and leg room and baggage space, they claim. In cases where an air-cooled rear engine has to be considered in order to obtain lightness and economy, "there are serious problems in providing adequate heating of the car and difficulty of achieving a satisfactory noise level in the passenger compartment."

The British engineers were outspoken on the safety aspects: "It is our very definite opinion that in head-on collisions it is better to have the mass of the power and transmission unit in front of the vehicle where its momentum may absorb some of the force of the impact, instead of at the rear where its mass will have an exactly opposite effect."

Boiling It Down-To many U. S.

There's More to Steering Than a Wheel



CALLING THE TURNS: Guesswork is taken out of steering column operation on testing machine at Mercury's quality control lab, Wayne, Mich. Inspector checks out all electrical operations in steering column.

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auto engineers familiar with the problems and the factors influencing the decision whether to place the engine in the front or rear, it boils down to a question of stability.

These engineers explain weight is an important factor in the design of any small car. Car designers try to hold weight to a minimum consistant with adequate passenger space, safey and structural rigidity for reasons of economy and performance.

Distributing the Load—The engine, naturally, is the largest single mass in a small car. And to obtain maximum passenger space, it is located at one end of the car or the other. Therefore, they point out, a rear engine car will tend to be rear-heavy and a front engine small car will tend to be front-heavy.

For example, weight distribution of a Volkswagen is 42 pct front and 58 pct rear. Renault Dauphine has 60 pct of its weight on the rear wheels. Both of these cars have rear mounted engines—the VW's is aircooled and the Renault's is liquid cooled.

Hillman 'Ideal'—By way of contrast, a Simca-sedan has 52 pct of its weight on the front and 48 pct on the rear. A typical U. S. model in the "low priced three" has weight distribution of 55 pct front and 45 pct rear. The Hillman Minx with a 50/50 distribution ratio has the ideal weight distribution. These all have engines in front.

Engineers claim weight distribution is important because a frontheavy car tends to "understeer," while a rear-heavy car tends to "oversteer."

Oversteering Is Bad—Why is this important? Take this example: Assume a car is traveling straight down a straight road. A side force, such as the wind, or the crown of a road, acting at the center of gravity will cause the car to change direction.

An oversteering car will turn toward the force. This sets up a separate centrifugal force of the curved path which is added to the original force. This actually increases the forces acting against the car and produces a self-generated disturb-

Automotive Production

WEEK ENDING	CARS T	RUCKS
Mar. 21, 1959	136,409	25,294
Mar. 14, 1959	134,283	24,368
Mar, 22, 1958	80,560	15,797
Mar. 15, 1958	86,447	16,852
TO DATE 1959	1,428,472	270,945
TO DATE 1958	1,132,425	206,058
*Preliminary	Source: Ward's	Reports

ance called "instability." The driver must take action to stabilize the car,

Understeering Is Better—On the other hand, understeering causes a car to turn away from the force. The centrifugal force from its path opposes the original force and tends to counteract it. Engineers refer to this as "stability." A "neutral" car would just drift sideways.

Simply stated, oversteering produces "instability" and understeering gives "stability."

Computers Warn—Some argue that rear engines should not go into cars with wheelbases over 100 in., weight of 2000 lb, and an engine of over 50 hp. None of the volume production European cars with rear engines are quite that large.

Ford and Chrysler engineers apparently subscribe to this theory. An engineer from one of the companies said they built rear engine cars according to known practices on paper and tested them on computers but always found them lacking stability.

What About GM? — He cautioned, however, that it's unlikely GM intends to product and market an unsafe automobile. While admitting he knows little of the engineering details of Chevrolet's small car, he said it won't have a conventional swing axle and this could help improve stability.

But the rear engine presents other problems, too. If the passenger compartment is moved forward, the front wheel housings protrude into the passenger compartment. Forward luggage space is less because of the wheelhousings. Heating and defrosting is more of a problem.

The Bull of the Woods

OF SAPS HUNDRED MACHINES THEY GO TO ONE IN TO BORROW TOOLS TO	WITH A DITTLE IN TH'SHOP O'TH'BIGGEST H'SHOP TO TH'BIGGEST D'MEASURE	MAT'S NOTHIN'! YOU DITI DO IT! IT'S NATIONAL TRAIT HEN BORROWIN!, ORROW ALL YOU AN! THEY AIN'T POIN' NOTHIN' UN- ISUAL, ONLY THAT THEY WILL GIVE THEM BACK!
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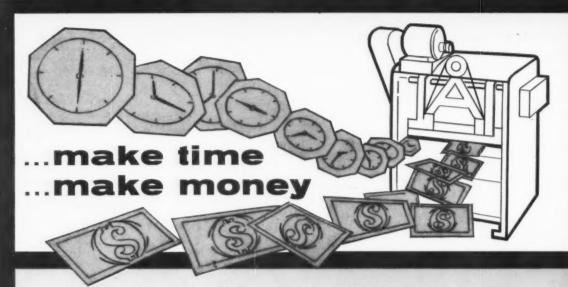
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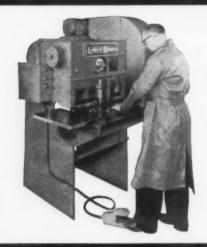
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House Will Probe Censorship

Military Accused of Hiding Mistakes This Way

Suppression of news stacks up as a major blot on Eisenhower Administration record.

Congressman tells how military screams "security" to hide blunders.—By G. H. Baker.

• Widespread government censorship, a major blot on the Eisenhower Administration's record, is stirring new wrath among congressmen.

The ruckus stems from what appears to be a built-in tendency of Eisenhower officials for news suppression. As a result, a new congressional probe of Washington secrecy is in the works.

House Will Act—House leaders have agreed to vote a new and detailed investigation of news censorship in the executive branch of the government. The probe will be directed by Rep. John E. Moss, (D., Calif.), who ran similar investigations in the previous Congress.

Moss is particularly critical of the Army, Navy, and Air Force, and their habit of crying "military secrecy" every time somebody asks where the money's going.

The military agencies have sometimes flatly refused to explain obvious blunders to the Comptroller General, whose job is to make sure executive departments and agencies spend their dollars honestly and reasonably.

Mum's the Word — Trouble is, there is a natural tendency for government officials to keep mum about their activities. Theory is you can't get into trouble over words you didn't speak. In addition, they are not eager to talk about errors—honest or otherwise—committed by their departments and offices.

The need for military security is being distorted regularly by military men to cover up inefficiency and possible mismanagement, Rep. Moss observes.

On the other side of the Capitol, Senator Hennings, (D., Mo.), is likewise pressing for reform of executive secrecy.

Why Are We Outbid?

A government commission to probe why foreign countries can underbid the U. S. producers of some types of machinery is being requested by an American labor union.

James B. Carey, president of the International Electrical, Radio and Machine Workers Union (AFL-CIO), is asking President Eisenhower to create the commission. He also proposes the commission study the effects on national defense of government contracts awarded to foreign firms.

Carey's Aim — The Carey proposal is a clear slap at U. S. industrial pricing practices, and is obviously designed to counter demands by some producers in this country for tighter restrictions on purchases by this government from overseas firms. These demands, and Carey's rebuttal, were touched off by the recent purchase for TVA of a 50,000 kw turbine from an English firm which underbid two American makers by about onethird.

Carey wants the commission to find out whether government is being "gouged" by U. S. makers trying for a monopoly.

A Round Table on Research

Togetherness — Research planning by agencies of the government should be coordinated. This is the aim of a new Federal Council for Science and Technology.

President Eisenhower created the council, says he believes it will help improve government support of science. Within the past 20 years, he notes, this support has climbed to more than \$5 billion from about \$100 million a year. He considers greater agency cooperation in research planning a basic need.

Under Killian — The President's special assistant for science and technology, Dr. James R. Killian, Jr., heads the council. Members will represent Defense, Interior, Agri-

culture, Commerce, and Health, Education, and Welfare Depts.

Also in the group will be the director of the National Science Foundation, the administrator of the National Aeronautics and Space Administration, and the chairman or another member of the Atomic Energy Commission.

To Advise—One function of this top-level council will be to recommend ways by which the government can bolster the whole scientific effort of the nation. Initially, these suggestions may come from a standing committee of the council, of scientists-administrators responsible for research in the various agencies. The council can approve or reject the committee's proposals.

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METALS MARKETPLACE: About 60,000 people jammed the Pan-Pacific Auditorium in Los Angeles

for the 11th Western Metal Congress. They came for a look at what's new in metalworking.

Review Space Age Metal Needs

Metals experts took a hard look at space age metalworking during last week's Western Metal Congress.

Some of the predictions:

Goods will be produced by methods and materials not now in existence.

Space age needs will add \$15 billion to the gross national product.—By R. R. Kay.

 Space age developments will add \$15 billion to the gross national product.

That was the prediction made at last week's 11th Western Metal Congress and Exposition by Dr. Clarence H. Lorig, president of the American Society for Metals and technical director of Battelle Memorial Institute.

New Horizons—Other experts at the Congress forecast that within ten years almost every plant in the U. S. will be producing goods by methods and with materials not now in existence.

Emphasis at the Los Angeles show was on the present as well as the future. An estimated 60,000 persons attended to see and hear about the latest metalworking developments.

Capsule Review—Here's a rundown on the unanswered problems they discussed and those already solved:

Magnesium-thorium alloys have raised the usefulness of magnesium alloys for making missiles, space vehicles, and piloted aircraft.

"Pulse beats" in the form of echo patterns are being shot through metals at the rate of 1000 beats per second to find their flaws.

A major source of failure in solid rocket motor cases comes from welding defects during fabrication.

Metal-arc inert-gas welding using the filler wire to carry welding current is better than the tungsten electrode method in making external fuel tanks for high speed jet aircraft.

Explosive Forming Gains—More and more experts believe that explosive forming is the only practical way to produce close tolerance, heat resistant, high strength parts. High rates of energy to form aircraft materials are getting a great deal of study.

Safety's Role—Demands of modern technology force designers to go to lower safety factors. As safety factors go down, the quality of raw materials and fabrication methods must go up. We must make sure we get a minimum quality closer to the ultimate strength of the material.

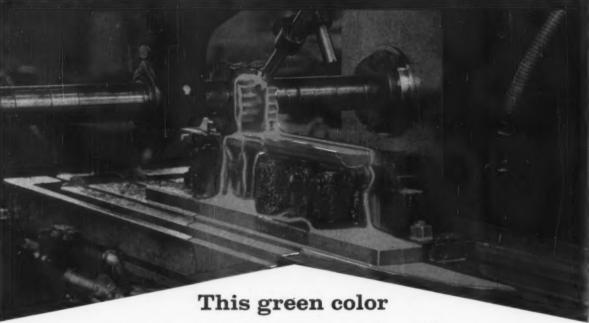
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New Way to Judge Investments

MAPI Formula Takes Mysticsm Out of Analysis

George Terborgh, MAPI research director, frowns on rulesof-thumb now in use.

He admits even the best formula cannot be an investment cure-all.—By E. J. Egan, Jr.

 If you're responsible in any way for your company's major investment decisions, there's a new booklet you might find interesting.

Its title: "An Introduction to Business Investment Analysis." The author: George Terborgh, research director of the Machinery and Allied Products Institute, 1200 Eighteenth St., N. W. Washington 6, D. C.

Heave-Ho to Old Ideas — Mr. Terborgh, as many of you know, is the daddy of the much-discussed MAPI formula-guide to profitable replacement of capital equipment. Last June, MAPI published another of Mr. Terborgh's books ("Business Investment Policy—A MAPI Study and Manual") in which he proposes a formula-and-chart method to aid management in making all types of investment decisions.

The booklet we speak of here is really only a lead-in to the larger volume. But it's long enough (34 pages) for Mr. Terborgh to make quite a pitch to management, urging you people to heave some of your old thumb-rules for spending money into the nearest trash can.

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Exercise in Mysticism—He discusses two such rules or tests that appear to be most favored as guides to investment decisions. One is the payoff-period test. The other is the rate-of-return test.

If you think you've been getting the right answers from either of these—well, here's what Mr. Terborgh has to say: "The rule-ofthumb devices traditionally popular in American industry do not make sense. Their use represents . . . an exercise in mysticism and results in an accumulation of mechanical zombies to the detriment of the enterprise concerned and the economy at large."

Getting Down to Cases—Having thus broken a couple of the businessman's favorite yardsticks over his knee, Mr. Terborgh gets down to cases about substituting investment formulas for "primitive" rules.

He points out why he thinks the formula approach is sound, and why he thinks it's here to stay. He explains each point in a list of requirements he feels any good

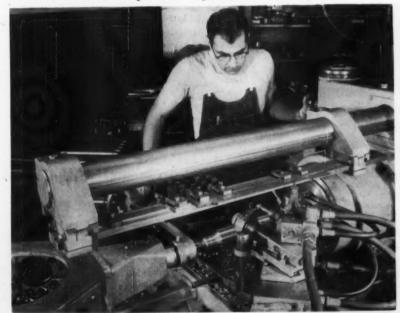
formula should have.

It's Actually Simpler—This leads—as you might expect—to a brief outline of the new and more encompassing MAPI formula. But here's something you might not have expected, and it's the reason why you might be interested in the booklet and eventually, in the formula itself. We'll let Mr. Terborgh say it:

"The new system is not only conceptually simpler than the old, hence easier for the layman to understand; it is actually simpler in application."

And if the terminology of the old formula approach had you hanging on the ropes: "The new system gets rid of these semantic handicaps entirely."

Sectional Template Speeds Setups



COST CUTTER: To trace-turn different-length shafts on this Warner & Swasey lathe, Hobart Bros. Co. changes only the middle-template section.

INDUSTRIAL BRIEFS

Guide to Missile Business—As a guide to companies seeking defense business, the '59 Missile Handbook has been published by Aircraft & Missiles Manufacturing, Chilton Co., Philadelphia. Produced in cooperation with the Assn. of Missile & Rocket Industries, copies are available at \$1 from AMRI, 1226 National Press Bldg., Washington 4, D. C.

Copper-Based Award—The Copper & Brass Research Assn., is offering an award competition to honor the year's most significant advancement in the use, application, or metallurgy of copper, brass, bronze, or other copper-base alloys. The winner will receive \$1,000 and a bronze award on May 13 at the Association's annual meeting at The Homestead, Hot Springs, Va.

Brick From the Sea—The new \$12 million magnesium plant of H. K. Porter Co., Inc. at Pascagoula, Miss., has gone into production. The magnesium is made from sea water and is mixed with a chrome ore imported from the Philippine Islands to make a highly heat-resistant brick for use in lining steelmaking furnaces. The product is called periclase grain.



"In the event of a disaster, such as enemy attack, Johnson will work his way across town and save us places in the unemployment compensation line." Ideal Purchase — Pfaudler Permutit Inc., acquired the Ideal Welding Co., Ltd., Toronto, Canada, at an undisclosed price. The Canadian firm, in the metal fabricating business, will be a wholly owned subsidiary. It becomes part of Pfaudler Permutit Western Hemisphere operations with vice president, G. C. Calvert directly responsible.

More Nonferrous—M. S. Kaplan Co., Chicago, has expanded its Nonferrous Metal Dept. by the election of Jay Kaplan as vice president. The department will specialize in high tin and Babbitt dross refining and other types of nonferrous metals. Additional buildings and specialized equipment will be constructed and installed to the present plant.

Three Way Blend—Royal Industries, Inc., Alhambra, Calif., has dedicated its \$100,000 engineering research and development center. In addition the company has entered into negotiations for a three-way merger. Besides Royal Industries and its subsidiary Royal Jet, the merger would include Vard, Inc. of Pasadena, and Ideal-Aerosmith, Inc., Hawthorne, Calif., and Cheyenne, Wyo.

More Vacuum Melting—Mallory-Sharon Metals Corp., Niles, O., will expand its vacuum annealing facilities for special metals by adding a new furnace in its Wrought Products Div. at the Niles plant. The furnace is expected to be in operation by late 1960.

Tools for Missilemakers—Clearing, division of U. S. Industries, Inc., has opened a new Aircraft and Missile Division in Los Angeles. The new division has been set up to work with the aircraft and missile industry in the development of special production machinery.

Now a Subsidiary—The Bay State Tap & Die Co., in Mansfield, Mass., has become a subsidiary of The Cleveland Twist Drill Co. Operations of Bay State will continue in Mansfield. Mr. L. A. Lincoln, will continue to serve as president.

Pipe Pressure—Facilities for testing of steel pipe at internal pressures up to 15,000 psi have been installed at the Ambridge plant, Tubular Division of The National Supply Co.

Scandium Pact — Two contracts for the production and study of scandium, a rare metal, were signed recently by Union Carbide Metals Co., Div. of Union Carbide Corp. The contracts totalling about \$60,000 were awarded by the Materials Laboratory, Air Research and Development Command, and the Air Materiel Command of the USAF.

Output Overseas—Union Carbide Corp., plans to build an ethylene oxide plant in Italy with an annual capacity of 26.4 million lbs. It is scheduled to begin in mid 1960. The unit will contribute to the activities of S.p.A. Celene, a jointly owned Italian company formed in '57 by Union Carbide and Societa Edison of Milan to produce chemicals and plastics.

B & D Downtown—The Black & Decker Mfg. Co. opened a new factory service branch at 227 Varick St., New York City, for users of their electric tool products in the Manhattan area.

Spotlight on Research—Precision Castparts Corp., Portland, Ore., has added 30,000 sq ft of floor space to its plant, and improved its research and development activities in the field of high-strength, high-temperature metals.

Leads Oven Division—Robert K. Baker, asst. manager, The R. C. Mahon Co.'s Industrial Equipment Div., Detroit, has been elected chairman of the newly-created Oven Division of the Industrial Heating Equipment Assn.

Togetherness—The Buckeye Steel Castings Co., Columbus, O., and the Advance Foundry Co., Dayton, O., have reached a mutual marketing agreement whereby the latter company will now furnish steel castings to the automotive industry.

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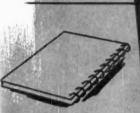
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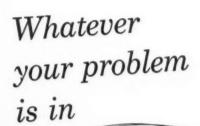
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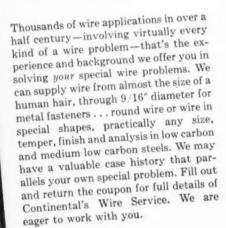
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1. HIGH S-W RATIO. One of the most efficient of modern structural forms is the light-weight honeycomb assembly—dubbed the sandwich panel. Typical is this one, designed for the supersonic B-58, and providing the strength of solid steel at less than half the weight. Here's how it's made—

PART OF THE PICTURE

when Twigg makes the remarkable sandwich panel...

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 "FOILED" FOR SUCCESS. Twigg Industries produce the sandwich panel for Convair. It calls for the most modern, most skillfully applied brazing technique.

Over each face of this stainless steel honeycomb "core" technicians lay a paper-thin sheet of brazing alloy. And here Airco is part of the picture—as supplier of this vital silver-copper-lithium "foi," which must produce uniform, high-strength joints resistant to corrosion and extreme operating temperatures.

Next come the panel's stainless steel skin sheets.



3. IN THE BAG. Now chemically clean core, foil, skins, edge members and slugs are assembled and spot-tacked. Components pre-joined, the panel is weld-sealed within an airtight stainless steel bag. At the purging station Airco again is part of the picture, supplying argon to replace the air in the bag.



4. BRAZED IN ARGON. Entire unit, now placed in a stainless steel retort in a furnace, is brazed for about 5 to 8 minutes at 1665°F. The atmospheres within both retort and envelope are purged continuously to maintain an environment of 100% Airco argon.

After the brazing cycle, the panel is chilled to $-100^{\circ}F$ with CO₂, reheated and X-rayed to make certain that fillets are completed and sound—an important step in the final checkout.



5. EVER-READY SUPPLY. From these Airco bulk trailers, argon and hydrogen are streamed directly into the Twigg brazing processes at Martinsville, Indiana. More and more, the bulk trailers of Airco are part of today's industrial picture: they represent an economical way to assure an ever-ready supply of needed industrial gases.

Manufacturers in aircraft and missiles, steel, electronics, chemicals, food processing and many other industries rely on Airco for dependable supplies of high purity industrial gases.

Airco also supplies welding and cutting equipment and electrodes, and renders technical service covering all phases of gas and gas equipment applications.

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Now! Porter goes basic! The first in the south, this new basic refractories plant at Pascagoula went "on stream" during February



Porter's new \$12 million Pascagoula Works is a sea-water periclase and basic

Southern industry will soon begin benefiting from faster deliveries and lower freight rates on all forms of basic refractories from H. K. Porter's new Pascagoula Works on the Gulf Coast. Inland waterways, too, will allow easy access to America's industrial heartland.

Products of this new works-Porter's 15th refractories plant-will include burned, chemically bonded, plated and plain brick, mortars, castables, plastics and ramming mixes of chrome and periclase compositions. A unique double-burning process employed in producing Porter periclase grain insures basic refractory products of the highest quality.

Annual output of this new plant indicates an ample, dependable source of supply. Equally important, Porter engineers and ceramists provide the complete customer service that is rapidly becoming recognized as a Porter principle.

For information on shipments, prices, or any refractories problem, write Pascagoula Works, Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.



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(burned and chemically bonded in both metal clad and plain categories) Chrome Magnesite

CM-30 CM-40 MC-70

Chrome Magnesite (Roof Brick) Magnesite Chrome Magnesite Chrome (for rotary kilns, offered in burned and plated only)

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M-90

Magnaram 85 Magnaram 95 Paritita

Chrome Air-Set Morter Plastic Chrome Ore **Ground Chrome Ore** Chrome Castable **Chrome Castable** Coarse Chrome Gun Mix Fine Chrome Gun Mix Periclase Ramming Mix, 85% MgO Periclase Ramming Mix, 95% MgO Periclase Air-Set Mortar

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H. M. Francis, elected executive vice president, American Steel & Wire Div., U. S. Steel Corp.

W. F. LeLand, elected chairman of the board, Leland-Gifford Co., Worcester, Mass.; S. B. Dowd, president; A. L. Wilkinson, elected treasurer.

H. G. Coffey, named vice president-general manager, Aetna-Standard Div., Blaw-Knox Co.

R. E. Krafve, elected group vice president — commercial, Raytheon Mfg. Co., Waltham, Mass.

H. C. Rooks, appointed vice president, engineering, The Trane Co., La Crosse, Wis.

Ralph Cutler, named a vice president, Yuba Consolidated Industries, Inc., and general manager, Southwest Welding and Manufacturing Division.

Ins, only)

1959



Dr. H. L. Garbarino, named chief engineer, electronics, Magnaflux Corp., Chicago.

G. W. Cross, elected vice president, operations and O. E. Fenske, Jr., vice president, sales, Mid-States Welder Mfg. Co. of Chicago.

A. T. Colwell, appointed vice president, engineering, research and development, Thompson Ramo Wooldridge Inc.

C. F. Duff, appointed vice president and sales manager, Morse Twist Drill & Machine Co., New Bedford, Mass., Division of Van Norman Industries, Inc.

P. C. Rossin, named general manager, Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa.; W. L. Bruckart, appointed manager, sales for Refractomet.

W. H. Stewart, appointed Pittsburgh district manager, Electrical Wire Div., John A. Roebling's Sons Corp., a subsidiary of The Colorado Fuel & Iron Corp.; T. A. Martino, appointed Cleveland district sales manager, Electrical Wire and Cable Division.

D. P. Cameron, appointed manager, Sandvik Coromant carbide sales, Sandvik Steel, Inc., Fair Lawn, N. J.

W. L. Hardy, appointed manager, marketing research, abrasive products, Norton Co.



J. R. Keates, elected vice president, sales, National Automatic Tool Co., Inc., Richmond, Ind.



F. A. Kaufman, appointed vice president and general manager, Universal-Cyclops Steel Corp., Bridgeville, Pa.

Dr. J. E. Taylor, appointed manager, research and development, Girdler Catalysts, Louisville, Ky., a unit of Chemetron Corp.'s Chemical Products Division.

J. I. Klivansky, appointed office credit manager, Louisville, Ky., warehouse of the Jones & Laughlin Steel Warehouse Division.

M. B. Monson, named general manager, Los Angeles plant, Joseph
T. Ryerson & Son, Inc.; C. S.
Hegel, named general manager at (Continued on P. 134)



E. G. Messler, elected vice president and asst. general manager, Sandvik Steel, Inc.

OBSOLETES MECHANICAL SWITCHES



new model 4912.AN

Responds to ferrous or non-ferrous metals without contact

Used for positioning or counting parts and controlling machinery

Electro Proximity Pickup and Control outlasts mechanical switches. Proven on production lines, conveyors and machinery. This inexpensive system detects stationery or moving metal pieces 1/10" diameter or larger. Wide selection of stock pickups.

Advantages over other switches

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- inkage
 meets JIC
- requirements operates for years without attention

- oil and water proof
 low pickup cost (from \$13.50)
- pickups to operate 100' from unit



Proximity Transducer System includes pickup control unit and cable.



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Measurements

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(Continued from P. 133)

Milwaukee: H. D. Robb, named national product manager for stainless steel; E. J. Richardson, named national product manager for alloy steel.



J. F. Baier, elected vice president. engineering, Metals Div., Arthur G. McKee & Co., Cleveland.

Dr. R. W. Fountain and Dr. Milton Stern, appointed technical supervisors, Metals Research Group, Technology Dept., Union Carbide Metals Co.

L. H. Kissler, appointed supervisor, distributor sales, Salt Lake City district, Linde Co., Div. of Union Carbide Corp.



A. L. Foell, vice president, Arthur G. McKee & Co., Cleveland. assumes additional duties concerning both engineering and consulting in the Metals Div. will now devote his time to new developments and processes within the metals industry.

W. L. Swager, named assistant manager. Department of Economics at Battelle Memorial Institute, Columbus, O.

L. H. Remstein, appointed manager, Order Service Dept., Solar Steel Corp.'s Hanover Division plant, Union, N. J.

T. A. Meade, elected vice president, AMF Pinspotters, Inc., a subsidiary of American Machine & Foundry Co.

R. L. Bishop, appointed manager, Houston branch, Acme Industries, Inc. of Jackson, Mich.

R. E. Mueller, named director. customer relations, Metallurgical, Inc., Minneapolis.

A. J. Weinburger, appointed industrial relations manager, Gulf States Tube Corp., Rosenberg, Texas, a wholly owned subsidiary of Michigan Seamless Tube Co., S. Lvon, Mich.

(Continued on P. 136)

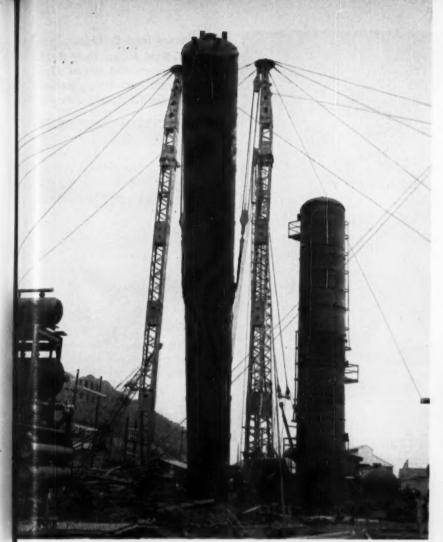


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The world's largest absorber will soon be in operation at the Hydro-carbon Extraction Facilities for United Fuel Gas Company of Charleston, West Va. Heart of the facility is the absorber vessel weighing 170 tons and measuring

102'-6"x 14' in diameter. To set this giant vessel upright, Pritchard used two 125-ton masts and Skagit hoists equipped with Yellow Strand Wire Rope. Pritchard selected two Yellow Strand Braided Safety Slings 49' long made of 8 parts of 1\%" wire rope to cradle the absorber as it was lifted and placed in position.

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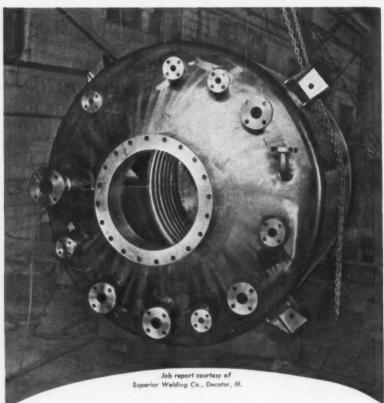
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This highly polished kettle is fabricated from type 304 ELC stainless steel. In use, it must process chemicals without a trace of contamination. Arcos CHROMEND 19-9 Cb Electrodes were selected by the fabricator to assure a weld metal of high uniformity... one whose chemical composition would not break down under corrosive attack and contaminate the product. Welding was done by manual arc. When you, too, must safeguard product quality, specify Arcos Electrodes for the job. ARCOS CORPORATION, 1500 South 50th Street Philadelphia 43. Pa.



(Continued from P. 134)

R. C. Reed, Jr., appointed district sales manager, Port Arthur, Tex., plant, Container Div., Jones & Laughlin Steel Corp.



E. A. Murray, appointed vice president, sales, American Steel & Wire Div., U. S. Steel Corp.

J. P. Spresser, appointed manager, planning, standards, and methods, Everett Foundries of General Electric's Foundry Dept.; B. J. Alperin, named supervisor, inspection of the Everett Foundries.

R. Y. Neiley, appointed assistant industrial sales manager, Sperry Products, Inc., Danbury, Conn.



W. L. Martin, appointed sales manager, Amplex Div., Chrysler Corp.

Thomas Bannon, promoted to director, production engineering, Clearing, Div. of U. S. Industries,

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Inc.; John Cameron, appointed assistant chief engineer, technical services; Ray Stejphal, becomes senior staff engineer; Lou Carrieri, becomes staff hydraulic engineer; Barney Bendicsen, becomes staff electrical engineer and Gail Navis, named staff assistant.

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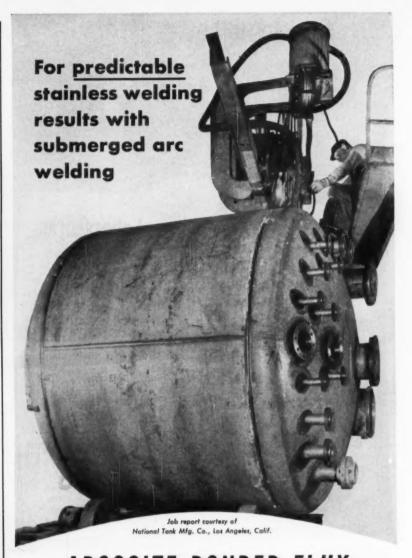
J. N. Kuzmick, becomes divisional manager, Manhattan Rubber Div., Raybestos-Manhattan, Inc.

J. R. Rinderknecht, appointed assistant director, profit control and computer programs, Sharon Steel Corp., Sharon, Pa.



R. G. Matters, named engineerin-charge, new materials engineering section, Steam Turbine Dept., Allis-Chalmers Mfg. Co.

K. L. Miller, appointed manager, Princeton, Ill., plant of Buffalo Bolt Co.; T. A. Norton, appointed factory manager, North Tonawanda (Continued on P. 138)

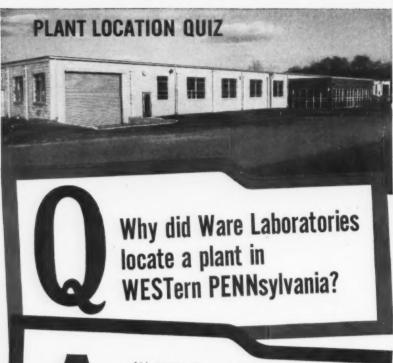


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(Continued from P. 137)

plant: W. W. Gohn, appointed comptroller. Buffalo Bolt Co.; R. W. Bachman, named comptroller, Buffalo Hydraulics Div.

- R. C. MacDonald, appointed assistant general superintendent, primary and pipe mills, Kaiser Steel's Fontana, Calif., plant.
- M. P. Heneghan, appointed manager, sales, Los Angeles district, U. S. Steel Supply Division.
- Drs. J. K. Stanley and J. A. Stavrolakis, appointed section managers in technical development, Crucible Steel Co. of America.
- G. B. Vieweg, Jr., appointed special projects assistant, Purchasing Division. Wheeling Steel Corp.
- A. P. Morano, appointed special assistant to the president, Conetta Tool & Die Co., Inc., Stamford, Conn
- C. L. Howard, promoted to industrial sales manager, Martin-Decker Corp., Long Beach, Calif.
- R. L. Hoffman, promoted to sales manager, Bloom Engineering Co., Inc., Pittsburgh.
- R. O. Tjensvold, appointed manager, Labor Relations Dept., Inland Steel Products Co.

Joseph Statsinger, named director, engineering, Servo Corp. of America, New Hyde Park, L. I., New York.

- M. A. Stachowiak, becomes research engineer, C. I. Hayes, Inc., Cranston, R. I.
- G. R. Kilsberg, named western regional sales representative, Hager Hinge Co.
- C. E. Person, named manager, Birmingham, Ala., district, Otis Elevator Co.
- H. W. Hauser, purchasing agent, Boston Works, Allis-Chalmers Mfg.
- G. H. Crock, named works manager, Indiana Div., Robertshaw-Fulton Controls Co., Indiana, Pa.

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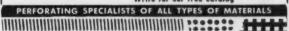
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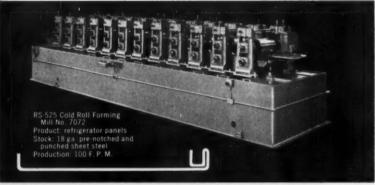
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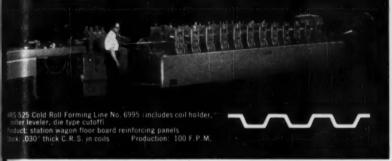
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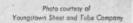
formity while eliminating many costly intermediate manufacturing functions.

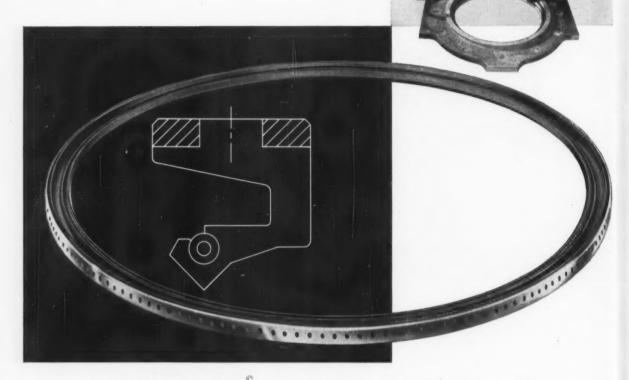
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Which Welding-Power Source Should You Buy?

By C. A. McClean-Process Engineer, Air Reduction Sales Co., New York

To weld efficiently, it's paramount that you use the right type of welding-power source. Here's an eight-step method to help you select the best one for any job.

A statement often heard in the welding field goes like this: ". . . and I'll use the welding machine I have."

It's certainly a sincere statement, and it's based on good intentions. But it could trigger a whole series of troubles if the welding-power source is incorrect or inadequate for the job.

How do you know which power source is correct for your job? First you must determine exactly what you want the unit to do. Then, there are eight more points for you to consider. You'll make the right choice if you study each type of power source in the light of these requirements:

- Location of the Welding Operation.
- 2. Job and Process Requirements.
 - 3. Type of Welding Current.
- Welding Machine Characteristics.
- 5. Auxiliary Devices in the Power Source.
- 6. Welding Power (amperes and arc volts).
 - 7. Welding Duty Cycle.

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8. Shop Power Supply Voltage.

As Fig. 1 shows, there are just four basic welding machine types to choose from. There are many varieties or subdivisions of these

four types, however. A general understanding of the more common ones will be helpful.

Transformers Only—For example, the transformer - only type breaks down into two major classifications (mechanical and electrical) according to the type of control used to adjust welding current, Fig. 2.

In turn, there are four major mechanical control types: (1) light duty or limited output (often designated "farm welder"), (2) standard heavy duty industrial, (3) tungsten arc, and (4) tungsten arc (balanced wave).

The basic electrical control type has three subdivisions: (1) the standard ac stick electrode welder, (2) the standard tungsten arc welder, and (3) the tungsten arc (balanced wave) unit.

Rectifier Added — The transformer/rectifier type breaks down into two major classifications de-

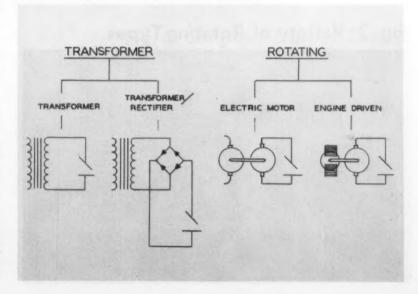
Program of AWS and AIEE technical sessions and list of Welding Show exhibitors begins on p. 176.

pending on whether the machine provides dc only or ac/dc output.

Going another step, the dc-only type can be subdivided three ways based on these characteristics: drooping, constant arc voltage (CAV), and rising arc voltage (RAV).

Combination ac/dc machines can also be broken down into two

Fig. 1: Basic Power Sources



groups on the basis of whether they are controlled mechanically or electrically. The one with mechanical control is a light duty unit of the farm welder type. There are two types of electrically controlled machines: one is the standard ac/dc welder for stick electrodes; the other is the ac/dc tungsten-arc type.

Rotary Units—Now for the rotating machines shown in Fig. 3. There are two basic classifications: the motor generator type (electric motor driven), and the engine driven (gasoline, diesel, etc.) type.

Most motor generator sets today produce dc output only. In terms of output there are three types of these welders, namely those having either drooping, CAV, or RAV characteristics.

Because of major design differences, engine driven welders are subdivided according to whether the generator field is stationary or rotating. The stationary-field type generally produces dc output with a drooping characteristic.

On the other hand, the rotating-field type provides several possible choices. These are ac output only, dc output only (available with either a drooping or a CAV characteristic), and combination ac/dc output (available for either stick electrodes only or for stick electrodes and tungsten arc).

Basis for Comparison—The static volt-amp curve, determined by laboratory tests, is an electrical "picture" of what happens at the welding terminals under various amperage and voltage conditions. These curves (Fig. 4) provide a basis for comparing various types of welders, and an indication of the results that can be expected.

The curve for a machine with a drooping characteristic indicates a relatively high open circuit voltage (the voltage at the welding terminals before the arc is struck). It is a reasonable amount above normal arc voltage to help establish and maintain the arc.

This curve also indicates (1) that short circuit current is limited by machine design to a value usable for stick electrodes, and (2) that amperage decreases as the voltage is increased (increased arc length).

Theory of CAV—In theory, the CAV curve would be perfectly flat as shown by the solid line in the center sketch of Fig. 4. Open circuit voltage is low compared to that of the drooping characteristic type of power source. Also, there is essentially unlimited amperage available to melt the electrode upon contact.

This type of power source will not tolerate a short circuit condition. In addition, the welding machine will automatically supply the correct amperage to maintain constant arc voltage. This is desirable for some uses of gas-shielded, consumable-metal-arc-welding.

However, this type of power source cannot be used for tungsten arc and stick electrode welding. Generally, the actual volt-amp curve for a CAV source will droop slightly (dotted line) and may drop off about 1 v for every 100-amp increase in welding current.

In some welders the amount of drop-off can be adjusted. In others, the volt-amp curve may rise slightly above the solid black line, drop back again, and at high amperages

Fig. 2: Transformer Types Classified

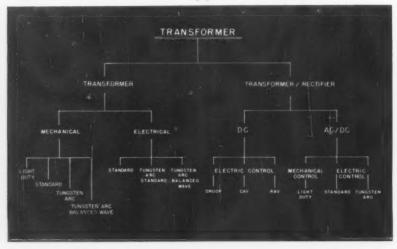
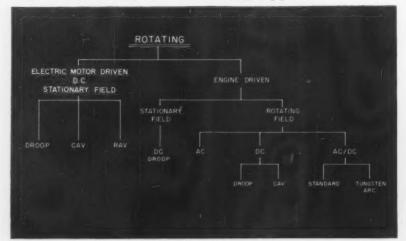


Fig. 3: Variety of Rotating Types



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How RAV Works — The voltamp curve for the RAV type of welder will provide increased arc voltage with increasing amperage. This maintains a constant arc length in gas-shielded, consumablemetal-arc welding, for various wire speeds. The amount of rise can be adjusted to match the arc characteristics of various sizes of wires. RAV power sources cannot be used for stick-electrode and TIG welding.

Now let's take one group at a time, look inside the unit, and show how one type of welder relates to another. Let's look first at the transformer-only type and, specifically, at the basic ac transformer itself.

"Turns Ratio" is Key—The important thing here is the "turns ratio," meaning that the relationship of input voltage to output voltage depends on the number of turns in the primary (input) and secondary (output) windings.

Putting 100 v on a primary winding having 100 turns will produce 1 v per turn. By the same token there would be 1 v applied to each turn in the secondary. Thus if the secondary has 10 turns there will be 10 v at the terminals.

Carrying this a step further, if 460 v is applied to a primary which is capable of drawing 30 amps, a secondary could be designed which would allow you to draw 460 amps at 30 arc volts.

The simplest way to control the output of a basic transformer welder is to provide the secondary with various connections, Fig. 5. Moving the electrode lead from one tap to another so as to use more turns of the secondary will increase the open circuit voltage (available before the arc is established).

Consider Reactance—Before going any further, the matter of reactance must be considered. It can be thought of as a throttling device, a constriction in the electrical system. Its effect increases with increased current flow.

In addition, the amount of iron around which the wires are wound and the number of turns of wire also affect this throttling phenomenon. Therefore, increasing the number of turns in the secondary not only increases the available voltage, but also increases the possibility of greater throttling of the current.

Tap the Secondary—As a result, the output curve of a welding machine designed as in Fig. 5 would resemble that shown at the bottom of the figure. For example, plugging into Tap C to use more secondary turns will make a higher open circuit voltage available before weld-

ing. But in the same case, when the arc is established there will be a lower amperage at welding voltage than if Tap A had been used.

The advantage here is the higher open circuit voltage available to establish an arc when welding with smaller electrodes and lower amperage. The disadvantage is a lack of stepless control; there are only as many amperage settings as there are taps in the secondary.

The Tapped Reactor—An improvement on this is the basic design of "tapped reactor" shown in Fig. 6. Here the number of secondary turns doesn't change. The idea is to put a separate winding

Fig. 4: Types of Volt-Amp Curves Compared

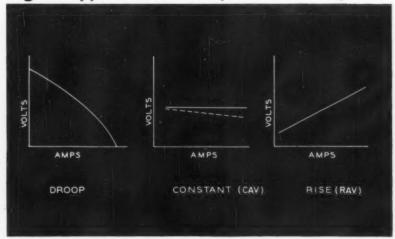


Fig. 5: Simplest Output Control

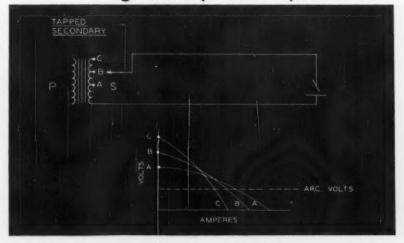


Fig. 6: Reactor Improves Control

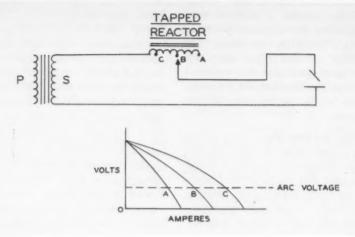


Fig. 7: Two Stepless Control Methods

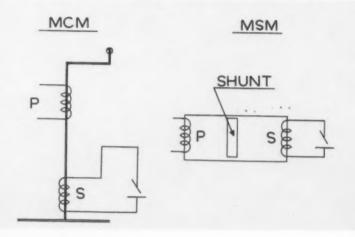
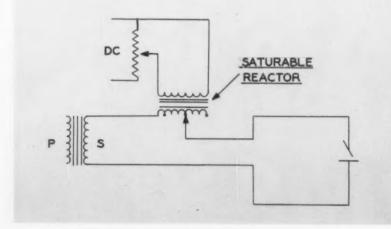


Fig. 8: Add DC for Remote Control



around some iron in the welding circuit and put various taps in it. Plugging into these changes the reactance without the disadvantage of lowering the open circuit voltage.

Typical volt-amp curves for this type of welder are also shown in Fig. 6. Increasing the amount of reactance by plugging into various taps causes the curve to slope downward more steeply and decrease the amperage available at welding voltage.

Add Stepless Control—Although the tapped-reactor design is an improvement, it still lacks the stepless control feature needed to provide practically any amperage over the full range. This degree of control can be achieved by mechanical means. Two ways of doing it are diagrammed in Fig. 7. One sketch shows a moving coil machine (MCM); the other shows a moving shunt (MSM) machine.

The MCM design mounts the secondary in a fixed position at the bottom of the machine. The primary is mounted on a screw-feed device so it can be moved toward or away from the secondary by turning a crank. Moving the primary closer to the secondary provides higher amperage output, and vice versa. The result is stepless control without changing the open circuit voltage.

How Shunt Works—The MSM design features a rectangular iron core with the primary on one side and the secondary on the other. If the shunt was not there, all of the magnetic field produced by the primary would flow through the iron and through the secondary for maximum output.

However, since a magnetic field always seeks the easiest path, it is a simple matter to mount another iron section (shunt) which can be cranked in or out of the central area of the main iron core.

Moving the shunt further into the core decreases output from the welder by causing more of the magnetic field to flow through the shunt

than through the secondary winding., Since this doesn't change the "turns ratio," the open circuit voltage stays the same.

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Remote Amperage Control—Both the MCM and MSM designs have certain disadvantages in that they are not readily equipped for remote amperage control. However, this can be managed electrically, as with the design sketched in Fig. 8.

Basically, this sketch resembles that of the tapped reactor shown in Fig. 6. But where the tapped reactor merely allows you to select ranges of welding current, the Fig. 8 design permits adjustment of amperage output within each range, and from a distance.

To understand how it works, consider that reactance is a function of the amount of iron in a reactor as well as the windings around it. When a given amount of iron is "saturated" with all the magnetic field it can hold it produces a specific amount of reactance.

Variable DC—If the iron was in the form of a pile of sheets, reactance could be changed by removing some (to increase amps), or by adding some (to decrease amps). Since this is not very practical, a direct current is used to control the amount of iron available for a changing magnetic field.

The idea is that a given amount of dc produces an unchanging amount of magnetism in the iron core. Since this amount of magnetism doesn't change, it doesn't throttle the ac flowing around the reactor. Thus dc flowing through the second winding on the reactor has the same effect as removing part of the iron core.

So the amperage adjustment knob on the Fig. 8 type of machine is simply a dc control. Increasing the dc increases the ac output for welding, and vice versa. Broad ranges of operating current are selected by various settings on the tapped reactor, while the dc control takes care of fine adjustments.

Fig. 9: H. F. Maintains Current Flow

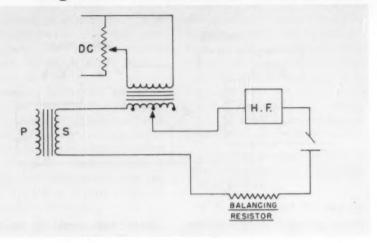


Fig. 10: Rectifiers Correct Unbalance

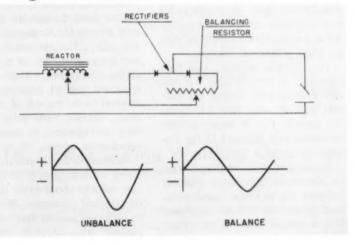


Fig. 11: Converts Output to DC

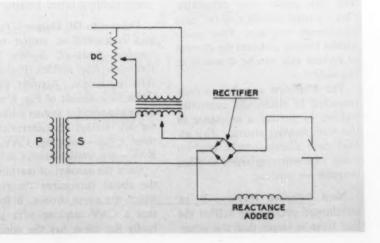
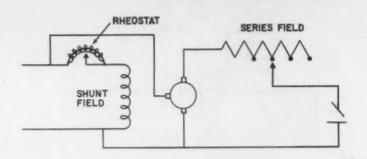


Fig. 12: Basic Stationary Field Design



Amperage output can also be regulated by the "magnetic amplifier" method.

Beyond Stick Electrodes — The discussion to this point has covered transformer type ac welders for use with stick electrodes only. Using ac for tungsten arc welding calls for some additional features.

For example, superimposed high frequency is used to keep the current flowing even though the current goes through zero 120 times per second. Fig. 9 shows a high frequency unit included in the circuit.

In addition, when welding is done on aluminum, the argon shielded tungsten arc produces some rectification; current flow in one direction is greater than in the other. When a dc flow is superimposed on ac in this manner it causes an unbalance.

Unbalance Causes Trouble— This can cause some difficulties. One is partial saturation of the main transformer windings. This causes useless heating and cuts the amount of current that can be drawn from the welder.

The condition can be partially corrected in electrically controlled welders by putting a resistance in the main welding circuit. This allows these machines to be used on many jobs requiring argon shielded tungsten arc with ac.

Need Balanced Waves — In an unbalanced circuit, one half of the sine wave is larger than the other.

Ideally, both should be the same size. The "balanced wave" welder (patented) diagrammed in Fig. 10 achieves this with two rectifiers in addition to resistors.

The rectifiers are arranged so that current flows through the resistance only during the large-wave half of the cycle. This reduces the size of the large wave-half to equal that of the smaller half. Moreover, the resistance can be adjusted to correspond to the amount of amperage used. Another basic design uses a bank of capacitors to achieve balanced wave output.

Another desirable feature of balanced wave welders is an open circuit voltage about twice that used on standard machines. This serves to maintain current flow when the current goes through the zero points. High frequency is used only until the arc is established, and then it shuts off. This makes for a quieter weld puddle and generally yields a better looking weld.

Convert to DC Output—To convert controlled ac output to the simplest form of dc-only transformer/rectifier welder (Fig. 11) is relatively simple. Actually, Fig. 11 is the basic circuit of Fig. 8 with a full-wave rectifier system added. As for arc voltage characteristics, all three types—drooping, CAV, and RAV—are available.

Since the amount of reactance in the circuit determines the rate at which the curve droops, it follows that a CAV machine with a virtually flat curve has the minimum practical amount of reactance. By tapping its secondary, the available voltage can be controlled.

Putting a polarity switch in the machine shown in Fig. 11 will simplify conversion from straight polarity dc to reverse polarity dc. This switch can also be used to bypass the rectifier.

Versatile Unit — The next step, adding a high frequency unit and a resistor in the proper places, will provide a highly versatile power source usable with both stick electrodes and tungsten arc.

Now for the rotating types of machines. Their operating principles are the same whether they are motor-generators or engine driven. There are two main classifications: (1) stationary field, (2) rotating field.

In the stationary-field type, Fig. 12, a range switch selects the broad range of operation and a rheostat adjusts the amperage within each range. Alternating current generated within the rotor is converted to dc by a commutator and brushes.

Offers Auxiliary Power—Output control of the rotating-field type of machine (Fig. 13) is achieved by rheostat control of dc fed to the field. A tapped reactor is used to select operating ranges. While welding with this type of machine, 115 v of auxiliary dc power can be drawn off to power lights or universal tools.

It is possible to place a second winding on the stator. Then, when the machine is not used for welding, it can serve as a power plant to supply either 115 or 230-v, 60-cycle, ac.

Although the field in this type of design is supplied with dc, the current supplied for the welding arc is ac. But a rectifier can be put in the circuit to convert it to dc, so that such welders are available for ac, dc, or ac/dc combination use with stick electrodes.

Optional Controls—For welding with tungsten arc, a high frequency unit can be added, and shielding gas controls are usually supplied. A

water coolant system (pumped by a motor connected to the 115-v auxiliary) can also be added to permit the use of water cooled tungsten arc holders.

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In general, the smaller sizes of rotating machines are ac only, usually with a tapped reactor for amperage control. Primarily, such machines are used for maintenance or similar work with stick electrodes only.

The dc and ac/dc machines generally have somewhat larger amperage ratings. Except for the CAV type, they are used primarily for stick electrode welding in the field. They can be used to a limited extent with other processes.

More to Think About — There are still a few more items to consider in choosing the best welding-power source for your particular needs.

First, take a look at process requirements. For welding with stick electrodes, the power source should have a drooping character-

istic. It should be capable of providing ac or dc (straight or reverse polarity) as required by the type of electrodes used for a particular job. Generally, this work also requires an open circuit voltage of 70-80 v to help start the arc.

Tungsten arc welding also needs a power source with a drooping characteristic. High frequency may be needed for starts on some applications or for continuous operation on certain ac work, particularly aluminum. A balanced wave design may also be needed for quality ac work on aluminum.

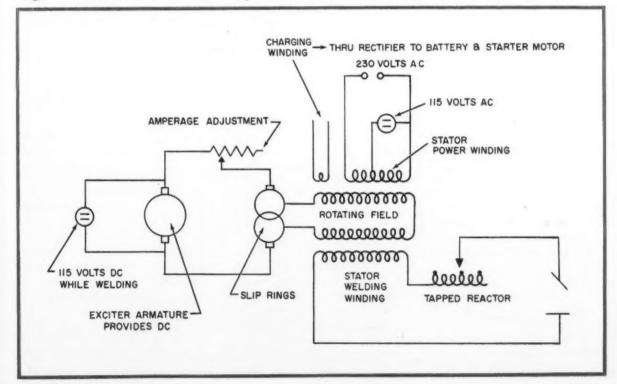
Need These Controls?—Shielding gas (and possibly water) controls are needed with tungsten arc work, and the need for remote control and current decay is also important. A contactor is generally required, and many power sources have a primary contactor built in. The availability of 115-v, 60-cycle, ac current to run the controls (and possibly a water cooling system) must also be considered.

For the gas-shielded consumable-metal-arc process, the power source should produce reverse polarity dc. Remote controls and a contactor must also be considered. This process can be used at a high duty cycle, so some thought must go to the rated duty cycle of the power source. The choice of drooping, CAV, or RAV characteristics depends on the job to be done.

Eight-Step Summary — Now to retrace the eight steps listed at the start of this article:

- 1. Location of the Welding Operation—For field welding, where no electrical power is available, choose an engine driven welder. For inside work choose one of the other three basic types.
- 2. Job and Process Requirements—Choice of a process (stick electrode, TIG, or MIG) depends on the material to be welded and the joint design. Job details determine the class of equipment:

Fig. 13: Provides Auxiliary DC Power During Welding Operation



manual, semiautomatic, automatic.

3. Type of Welding Current—The use of ac or dc depends on the process and the filler metal.

4. Welding Machine Characteristics—Stick electrodes take a drooping - characteristic power source. So does tungsten arc welding. All three types (drooping, CAV, RAV) are usable for gasshielded metal-arc work. However, RAV is generally most suitable for MIG welding. For manual MIG cutting use a drooping characteristic; for automatic MIG cutting use CAV.

5. Auxiliary Devices in the Power Source—Again the process governs the choice of such things as continuous high frequency, bal-

anced wave devices, gas and water controls and other features.

6. Welding Power — The amps and volts required for the job determine the size of the welding machine. Never buy a size that will just get by. If the job requires 300 amps, buy a 400-amp machine.

7. Welding Duty Cycle—Watch duty cycle ratings. A machine rated at 300 amps, 60-pct duty cycle, should not be operated more than 60 pct of the time at 300 amps. As a rule of thumb, a machine rated at 60-pct duty cycle should be limited to 34 of the amp rating at 100 pct duty.

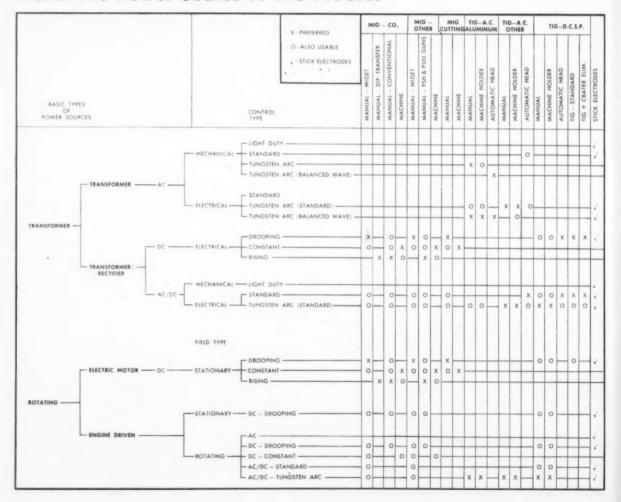
8. Shop Power Supply Voltage—Most welders are designed to work on two or more primary line volt-

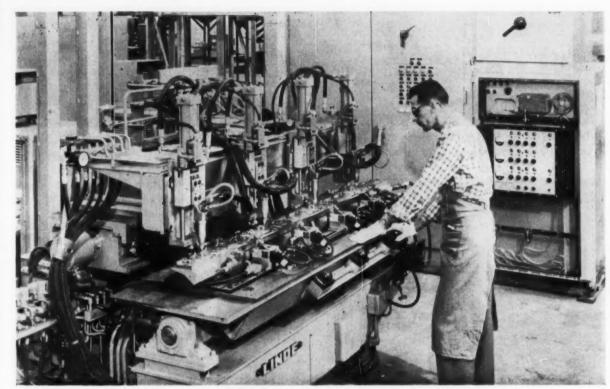
ages. The most common arrangement is for 230-460 v of primary input, with the welder having reconnectable links to make the change from one voltage to the other.

For further help use the power source - classification chart printed below. If you know your application needs and understand what the right power source can do, your investment will pay big dividends.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Match the Power Source to the Process





BOOST FOR ARC WELDING: Programmed tape (right) controls setup to produce 2520 spot welds an hour.

Punched Tape Adds Precision To Automatic Welding

Punched tape takes over control of spot welding critical missile fins.

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> Built-in flexibility will enable the setup to cope with future design in industrial as well as missile fields.

> ■ Solving a missile problem has brought about the development of a spot-welding setup that is a basic production tool. Although now used for welding the airfoil sections of guided missiles, it will adapt to general application.

Key to welding and positioning is a punched-tape program unit. It brings automated operation to a precision assembly with a minimum of operator effort.

Welds from One Side—The basic welding unit is a multi-torch Heliarc spot-welding machine designed by Linde Co., Div. of Union Carbide Corp., New York. It fills the need for a unit to weld joints from only one side.

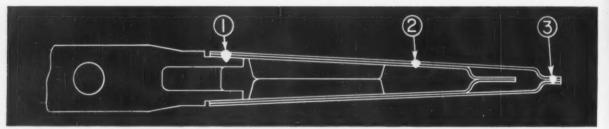
In the four-torch setup, the Heliarc method makes small localized fusion welds from one side of two or more lapped pieces of metal. An electric arc between a tungsten electrode and the part to be welded produces the heat for making the weld. Argon is the shielding gas.

Pilot-arc starting insures positive starting of the main arc. The 5-

amp pilot are keeps the electrode hot and the shielding gas ionized.

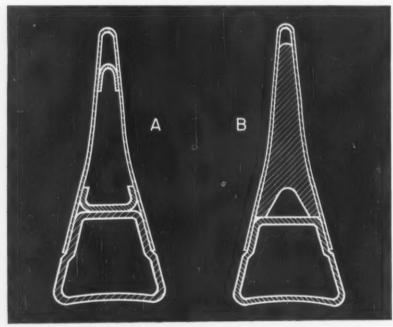
Stress Reliability—The arc insures instantaneous ignition on every weld, an important factor where such a high degree of automation is used, as stated by R. L. Hackman of Linde's Development Laboratory. Further, the pilot serves to provide a post-heating effect for eliminating pipes and cracking.

The setup, installed at Convair Div., General Dynamics Corp., Pomona, Calif., takes over the challenge of fabricating fins for the Terrior surface-to-air guided missile for the U. S. Navy and Marine Corps. Two types are involved: a control fin of 17-7PH stainless steel

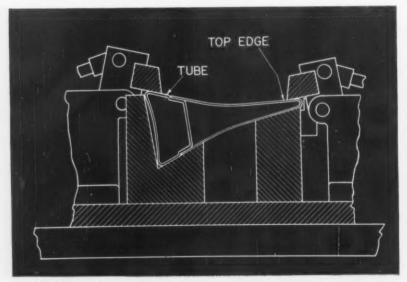


CONTROL FIN: Arc welding copes with a variety of joints: At No. 1, spar forging forms large heat sink;

at No. 2, joint is accessible from only one side; and at No. 3, the problem is to weld without distortion.



DORSAL FIN: At section A, heat buildup must be prevented from causing channels to walk away from skin. Section B involves large heat sink.



CLAMPS HOLD ALIGNMENT: Clamps hold down tube to prevent bowing. Top edge is also restrained. Locating points insure accuracy.

and a dorsal fin of 1020 carbon steel. The control fin guides the missile.

Seven parts make up the control fin: the spar, two diaphragm sections formed as Jox sections for stiffening, the two skins, a leading edge and a trailing edge filler.

Joints Vary — The assembly involves three types of welds. First is a joint in which the 0.025-in. skin and 0.016-in. diaphragm sections are joined to the forged spar. While the drawing shows a relatively thin spar section, in other areas its thickness grows to 27 times that of the 0.016-in. diaphragm section, forming a large heat sink.

Typical of many joints, the second type is a blind weld with only one side accessible. The third type occurs at the trailing edges of the skins.

With such thin sheet sections, the problem is to weld without distortion. Aerodynamic surfaces demand close tolerances.

For Blind Work—The dorsal fin poses different fabricating problems. In cross section A, shown on the drawing, it's made up of four parts: a tube with a wall of about 0.090 in., a 0.042-in. skin, a stiffening channel and the leading or trailing channel with 0.025-in. thickness.

Compared to the control fin, the ratio of thicknesses is relatively small, but the channels are completely blind on both sides. Heat build-up must be prevented from causing the channels to walk away internally from the skin.

In cross section B, there's the

added section representing a rib or leading or trailing tip forging. Again the thickness ratio is relatively large and a big heat sink is involved.

Triple Control Setup — Three distinct interlocked control sections function in the welding setup: tape control, mechanical control and welding control.

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As brains of the machine, the tape control reads a tape on which are punched six different channels. Three of these channels represent machine position information, controlling the X and Y cross slides and tilting the work platen. The other three supply information on welding current, welding time, and torch combination.

The mechanical control directs the operation of the supply lines to the hydraulic motors and monitors the fixturing and part location accuracy. It checks such items as proper cooling-water flow and arcshielding gas pressure.

Mechanical Double Check — To avoid possible machine damage, the mechanical control checks for complete retraction of the torch slides and prevents over-travel of the axis movement. It's a double check on the tape control which will normally stop all operation and signal an error if a movement is in excess of that commanded.

Welding control signals the selected torches to lower and apply a pre-set pressure to the weldment, and then closes the welding contactors for selected welding time interval. In addition it maintains the post-heat hold and raises the torches at the completion of the weld cycle.

The following considerations determined machine design concept: process requirements for the Heliarc spot-welding process, means for positioning the torch relative to the part, method of fixturing the part to control both accuracy and distortion, and a high degree of flexibility for future applications.

Process Needs—To set up exact values of weld current and weld

time for programming, preselectors can be set for any desired value. Hold time, while not critical, is controlled to obtain pilot-arc post-heat and prevent crater cracking. Torch pressure in maintaining fitup is also carefully controlled to avoid distortion.

There are two factors in torch positioning: First is to locate the weld within tolerance allowed for the part. Secondly, weld surface must be normal to the axis of the torch.

In the horizontal plane, the torch rides on two horizontal slides at right angles to each other. Pistontype hydraulic motors position the slides through ball bearing lead screws.

Platen Turns for Torch—To keep weld surfaces normal, the work platen on which the fixturing is mounted rotates beneath the torch. It's done with a trunnion mounting, allowing a 20° tilt to either side of horizontal.

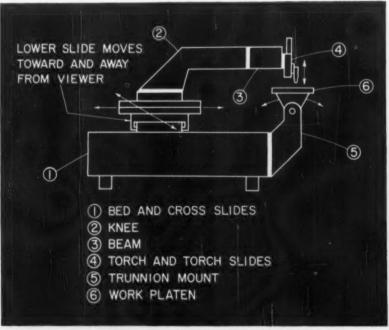
Fixturing for the control fin is mainly a matter of support and location of the part. But for the dorsal fin considerable restraint is used.

Fastening down of the tube section prevents bowing both longitudinally and laterally. The top edge is similarly restrained. For both parts accurate locating points insure accuracy of torch positioning.

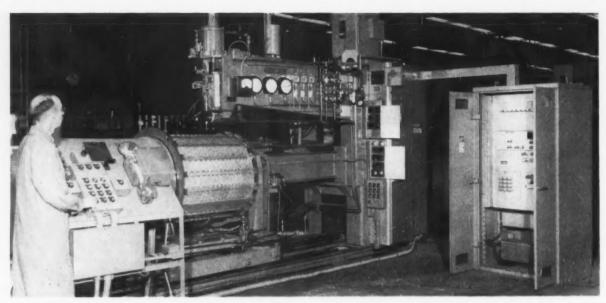
Built for Change—In order to obtain maximum flexibility for future uses, the machine is designed with major sections doweled and bolted together. Each of the sections can be replaced with another assembly of difference size or shape.

In making up the welding setup, Linde sub-contracted the Welding Machine Div., Expert Tool & Die Co., Inc., Detroit, to build the basic machine. Farrand Controls Corp., New York, supplied the punchedtape program control unit.

In adapting the tape-controlled setup to general use, it will probably prove most useful under the following production conditions: when applied to a family of parts rather than just one or two parts and when used for making a multiplicity of spot welds.



ADAPTS TO FUTURE: Heavy lines show where major sections are doweled and bolted together. Each section can be replaced to alter setup.



MULTIPLE SPOTS: Tape-controlled setup does 1600 welds on stainless jet drum in 1½ hours. Air-operated

unit, 150 kva, single phase, 60-in. throat, is a press type with 3000 lb maximum weld pressure.

Tape Guides Resistance Welder Through Complex Assembly

Without fuss or fanfare numerical control guides a spotwelder in pioneering assembly of jet engine parts.

It allows complex welding sequence with automatic positioning. Fast makeup of coded paper tape makes changes easy.

• Resistance welding adapts so well to automatic cycles, you'd naturally expect it to be paired with numerical controls sooner or later. Finally it has. It's a production application at General Electric Small Aircraft Engine Department, Everett, Mass.

It's a welcome advance, because jet engine components afford so little opportunity for automation. The problem is that of constant design changes and rather small production runs. Still, GE engineers felt that for spot welding of large and unwieldy components, such as jet after-burners, there was need to eliminate tedious manual handling. Yet they needed tooling flexibility to make fast changeovers at minimum cost.

Tape Does It—While an indexing fixture would be one answer, it seemed out of the question. Assembly was particularly slow and troublesome because welds had to be varied from one to four over the various tabs being assembled. It seemed to rule out any automatic setup.

That's where tape control comes into the picture. The company's specialty control department already had available a numerical positioning control system that was suitable for the job. National Electric Welding Machine Co., Bay City, Mich.,

which had been consulted on the problem, huddled with control department engineers and came up with the answers.

Spot Welding Cycle—The machine they developed is a single-head spotwelder. A numerically-controlled work positioner moves the work in and out, and sidewise, while rotating it under the welding electrodes.

It takes over 1600 welds to join the cylindrical afterburner liners with reinforcements. Material for the assembly is stainless.

Reinforcements are pre-tacked in position along the surface of the liner parallel to its axis. Desired location of welds is coded in a program on punched paper tape.

Only Needs Load — For automatic operation, the operator loads

the work into the welding fixture. He places the tape program in the reader and pushes the start button. The control selects the proper heat and weld time, then sets the transverse fixture position for the first weld.

The code identifies the desired motion for positioning fixture.

When the first row of welds is finished, the fixture indexes to the next row. Automatic operation proceeds in this fashion until the liner is completely welded. The machine positions rotary and longitudinal motions at 150 ipm.

Once the part is loaded, the tape control takes command, and completes spot welding without further operator attention. The setup controls all moving functions of the fixture and the basic welding settings of the head.

Complex Sequence—At the completion of each rotary index movement, the controls actuate a holding brake to prevent the fixture from rotating during the next series of welds. When the fixture is in proper alignment for welding, the control gives a "position complete" signal to the welding control, which then begins the welding cycle.

When that block of welds is finished, the welding control signals "welding complete." The numerical positioning control then acts on the next block of information it reads from the tape. After the machine changes auxiliary function settings, the fixture feeds longitudinally and the process repeats until the row of welds is complete.

Again, the controls call for rotary index and positioning, followed by the longitudinal positioning and welding. After the last tab weld is made, a light comes on to signal "end of run" at the operator's console.

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Adaptable Unit — The big advantage of the setup lies in its adaptability. If spot locations of a part should change, it's only necessary to punch a new tape.

This is a matter of a few hours at most. If the change is minor,

good portions of the old tape can be automatically reproduced, alterations made manually. If the new part is of a different diameter, it would require new end plates, which can be easily provided at low cost.

Because the setup eliminates operator effort and fatigue in positioning, closer tolerances are held on each weld. While only 1/64th in. is required, tests show the unit can operate to as close as 0.005-in. In addition, there's less scrap, more weld uniformity and better overall quality.

Production Gains—Weld time is roughly 1 second to make two welds per tab, plus 1 second for positioning. Overall production time has been cut by 81 pct.

With the total of 1650 spots per drum, one assembly takes 1½ manhours. Previous methods took some 16 manhours.

Based on this production, it's

estimated that the machine will pay for itself in roughly 2 years. The plant's engineers anticipate the annual savings to be in the neighborhood of \$26,000.

Auxiliary Control — Numerical control on this machine takes care of additional functions. It automatically selects one of several preset weld times and the weld current to compensate for varying stock thickness or weld current shunting conditions.

Other functions are control of cooling water, lubrication, and line voltage variations. Also the machine automatically stops the welding sequence for tip cleaning after a predetermined number of welds.

National Electric engineers forecast many more jobs for numerical control in resistance welding. It's understood there are already several other applications on the boards around the country.



READS TAPE: At pushbutton control station tape-reader takes orders from punched paper tape. Setup cuts overall production time by 81 pct.

Electron-Beam Welding Process Operates in a Vacuum

Here's a new approach to the problem of joining some of today's exotic materials.

It produces high-purity welds with excellent fusion zone geometry.

• One of the more dramatic new methods of joining metals is the electron-beam welding process. It develops heat for making highpurity welds by bombarding the work with a concentrated beam of electrons, either continuous or impulse.

Since it operates in a vacuum, it virtually eliminates contamina-

tion. It makes for precise control of welding variables and produces very favorable weld fusion zone geometry.

There are several systems for generating an electron beam capable of producing the thermal effects required to fuse metal. One of the more advanced units is made by Carl Zeiss of Western Germany and being marketed here by Electrona, Inc., New York.

The Zeiss welder is an offshoot of the Zeiss electron microscope. It generates a focused electron beam of extremely high power concentration. One kilowatt of energy is concentrated into a focal spot estimated to be 0.010 to 0.020 in. in diam at a distance of 1 to 2 in. below the magnetic lens.

Potentials of 50 to 100 kv and currents of from 8 to 12 milliamps are used, and the welding chamber is evacuated to 10⁻⁴ to 10⁻⁵ mm mercury pressure. At this high intensity of energy input to the workpiece the configuration of the fusion zone differs appreciably from that produced by other welding methods. Conventional welds have a width to depth ratio of two or three to one; electron beam welds have a ratio of better than one to two.

Still Undergoing Trials — Initial work with the process has been mostly on highly reactive metals for nuclear core fabrications. Butt joints in vacuum melted Zircaloy 2 have been welded.

Welding speed on Zircaloy ranges up to 15 ipm. Speeds of 12 ipm have been attained with Zircaloy up to 1/4 in. thick.

During the course of this work it was found that the maximum focalization of the electron beam by the magnetic lens couldn't be utilized because of excessive vaporization of metal. However, for materials other than Zircaloy it's conceivable that maximum focalization could be used.

The electron-beam method has proved adaptable to carbon steel, all grades of stainless, and molybdenum.

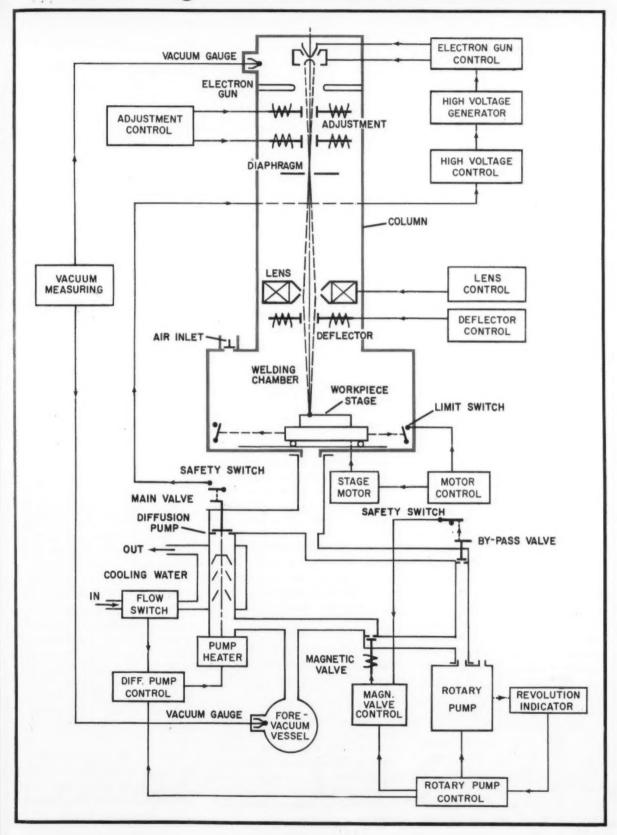
How It Works—Welding is done by means of an intensive, precisely focused electron beam in a vacuum chamber. Energy applied to the unit area is so large that the material liquefies immediately and melts together with the neighboring surface. Total energy, however, is so small that parts adjoining the welding seam are not excessively heated.

This effect of the high specific



ATOM-AGE WELDER: Operator in Olin Mathieson metals lab observes work in vacuum chamber of 2-kw electron-beam unit by means of binoculars.

Functional diagram of Zeiss electron-beam welder



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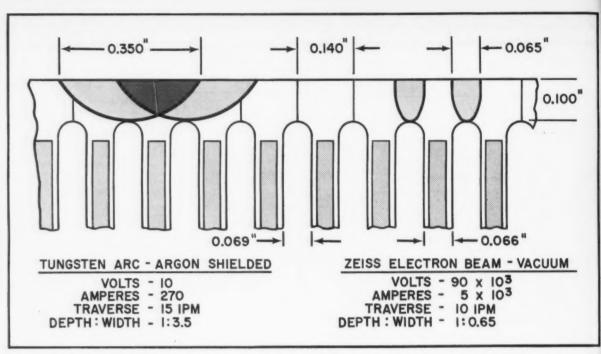
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MARKFD DIFFERENCE: Weld-zone geometry is excellent. These are typical longitudinal welds on Zircaloy 2.

load per unit area at a comparatively small increase in temperature of the entire workpiece is further amplified by the fact that the electron beam is not applied continuously. It works in pulses so that the energy required for a small welding spot can always be conducted away between pulses without excessively heating the surrounding area.

Complex Unit-The welding machine consists of six main parts: an electron-optical column consisting of electron gun, beam adjustment, magnetic focusing lens, beam deflection, and the welding chamber; a vacuum system consisting of a three-stage water-cooled oil diffusion pump, a rotary forepump, and mechanical and magnetic valves; voltage and current supplies to operate the electron beam; a pulse generator to control intensity of the electron beam; current supplies for the adjusting device, magnetic focusing lens, and beam deflection; and electrical circuits for the vacuum system, illumination, and the stage motor.

The electron-optical column can be set up in two different ways. In one, the pre-focused electron beam produced by the electron gun hits the workpiece direct; in the second instance it's further focused by a magnetic lens.

Inside the Column — The high voltage required to accelerate the electrons is supplied to the cathode via a large porcelain insulator. This insulator is projected against inadvertent contact by a protective shield.

The electron gun attached to the cathode insulator can be adjusted in such a way that the electron beam passes the anode diaphragm. The beam adjusting device consists of 8 coils by means of which the electron beam is directed into the optical axis and thus through the diaphragm. The diaphragm can be moved into the optical axis from the outside.

By means of a deflecting system the electron beam is quickly moved back and forth between two welding spots by 60-cps ac voltage. Below this deflecting system is a centrically bored mirror by means of which the workpiece and thus the welding process can be observed through a window.

Parts to be welded are clamped on a mechanical stage, which can be displaced 120 mm in two directions. Movement toward the observer is effected by hand or via gear motor, while displacement in the other direction is exclusively by hand. If the motor is used, any damage when hitting one of the two stops is eliminated.

Bigger Picture—Also available is an improved viewing device in the form of a stereo microscope. With this second setup, the work is viewed through binoculars at magnifications ranging from 10x to 64x.

Rough pumping is done by a rotary forepump set up separately. By means of a hand-operated three-way cutoff the pump can be connected directly with the column or with the diffusion pump. The cil diffusion pump built into the stand is opened toward the column by means of a hand-operated main valve.

The high voltage supply unit, also separate from the main machine, consists of two parts: high voltage oil transformer with diode rectifier and a switch control desk.



SOLVING MODERN DESIGN SPECIFICATIONS

Parts for Missiles—Rockets—Jet Engines are constantly calling for newer alloys to operate at higher temperatures. Alloys made by the Midvac process of consumable electrode melting are currently answering these needs and new ones are being developed in anticipation of more critical operations.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 165.

Vinyl Coating

"Vinyl Maintenance Top Coats Over Phenolic Primers" is a 5-page technical bulletin. It describes a new phenolic/vinyl system of maintenance coatings for metals. (Union Carbide Plastics Co.)

For free copy circle No. 1 on postcard, p. 165

Digital Processor

Up to 10,000 samples per second are handled by a high-speed digital processor described in a 6-page bulletin. The unit is compatible with all leading computers. (Consolidated Electrodynamics Corp.)

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Temperature Control

Details on a temperature indicating controller are included in a 4-page folder. Units cover from —150 to +700°F, up to 20 amp 125 vac current ratings. (Fenwal, Inc.)

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Battery Charger

A chart is now available to help you find the proper size and model silicon-rectifier charger for use with your stand-by batteries. Tabulating data on 27 basic models, the chart lets the user select chargers according to number of battery cells to be charged, output amperage and input voltage and phase. (Exide Industrial Div., Electric Storage Battery Co.)

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Chain Fence

Chain link fence shown in new literature has aluminized steel fabric. (Page Steel & Wire Div., American Chain & Cable Co.)

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Industrial TV

Heavy duty, remote control mounts for industrial television cameras may simplify your control problems. A technical data sheet shows how the mounts work. (Kin Tel Div., Chou Electronics, Inc.)
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Jig Grinder

Exceptional locational accuracy of a new precision jig grinder is discussed in a brochure. (Moore Special Tool Co.)

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Diecast Cap Nuts

Standard specification sheets cover diecast washer-base cap nuts They are of zinc alloy. (Gries Reproducer Corp.)

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V-belt Drives

Space saving V-belt drives are detailed in a 44-page bulletin. These drives are smaller, cost less, weigh less and take less space than conventional V-belt drives. They deliver three times as much horse-

power for the space. (Dodge Mfg. Corp.)

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Magnetic Flowmeter

For metering difficult liquids, a magnetic flowmeter handles flows from a fraction of a gpm to many millions of gallons per day. A 6-page catalog gives details. (Fischer & Porter Co.)

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Deep throat punching presses shown in a bulletin handle light and medium cutting, punching and flanging. Capacities: 15, 25 and 35 tons. (The Minster Machine Co.) For free copy circle No. 11 on postcard, p. 165

Boring Tools

Block-type boring tools introduced in a bulletin have square precision-ground throwaway carbide inserts. Blocks fit standard boring bars. (Davis Boring Tool Div., Giddings & Lewis Machine Tool Co.) For free copy circle No. 12 on postcard, p. 165

Air Chucks

Three basic models comprise a line of air-operated diaphragm chucks. A 4-page bulletin describes them. (Erickson Tool Co.)

For free copy circle No. 13 on postcard, p. 165

pH Recorder

A pH recorder described in new literature consists of a Beckman electrode assembly and amplifier and a Bailey potentiometer recorder. (Bailey Meter Co.)

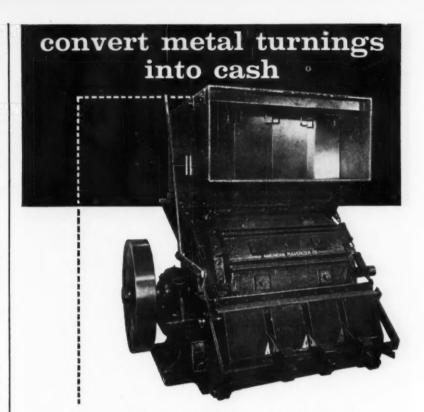
For free copy circle No. 14 on postcard, p. 165

Gearmotors

Right angle gearmotors are covered in a 4-page bulletin. Ratings range from ½ to 30 hp, single reduction, with output speeds of 23 to 280 rpm. (The Louis Allis Co.)
For free copy circle No. 15 on postcard, p. 165

Locomotives

Industrial and mining locomotives are featured in an 8-page folder. Both gasoline and diesel



Long, curly, troublesome metal turnings, reduced in an American Metal Turnings Crusher, can produce additional profits for your plant.

Reduced to chip form, metal turnings bring \$2 to \$5 more per ton. Handling metal chips by shovel or pneumatic systems is easier, too, and chips require 75% less storage space than bulky machine turnings. You'll recover more cutting oil from chips... up to 50 gallons per ton! More important, American Metal Turnings Crushers pay for themselves and produce substantial profits for years to come. Models available with capacities ranging from 1 to 50 tons per hour. To get all the details, write American today.

reclaim fused welding flux

One industrial plant saved more than \$10,000 a year by using an American Welding Flux Crusher to regranulate fused welding flux. Write American for details.





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FREE LITERATURE

powered models appear. Sizes range from 3 to 80 tons. Money saving features of these units for switching, hauling and spotting are reviewed. (Plymouth Locomotive Works).

For free copy circle No. 16 on postcard, p. 165

Heat Treating

New heat treating ideas are reviewed in a company publication. A 2-page article introduces a gearmaking job shop's new facility for heat-treating an unpredictable variety of gears. (Surface Combustion Corp.)

For free copy circle No. 17 on postcard, p. 165

Sealing Washers

Want to get completely leakproof installations with any threaded fastener? You can, points out a 4-page folder, when you use a particular sealing washer. It seals against liquids or gases. (Bartite Products Corp.)

For free copy circle No. 18 on postcard, p. 165

Wire Forming Unit

Described in a 6-page bulletin is a new vertical four-slide machine. Adapted from a Meyer, Roth & Pastor design, the unit boasts high production, accuracy and rapid setup. (Machine Div., Torrington Mfg. Co.)

For free copy circle No. 19 on postcard, p. 165

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Comparators

Pneumatic comparator gages are announced in a catalog. It presents an entirely new line of gages for dimensional measurement and a series of automation building blocks for size-control systems. (Moore Products Co.)

For free copy circle No. 20 on postcard, p. 165

Castings

The 1959 edition of a foundry's reference chart has just come off the press. It covers carbon, low alloy and stainless steel castings. Reviewed are: mechanical properties, analyses, specification designations and heat treatments. (Lebanon Steel Foundry).

For free copy circle No. 66 on postcard, p. 165

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one-piece locknut... with prevailing torque

Three sectors of the tapered portion of the CONE-LOK nut are preformed inwardly (Fig. 1). When the Nut is applied to a bolt, these conforming sectors are elastically returned to a circular configuration and create an inward and downward pressure which produces intimate contact between the load carrying flanks of the nut and bolt threads (Fig. 2). The shape of the cone sector displacement insures conformity with the mating bolt and maximum friction contact area. . . . The closed stress path in the locking portion of the nut and the advantageous distribution of locking pressure, produce a locking device of high fatigue life . . . and equivalent locking force is exerted at only a fraction of the stress of any slotted type locknut. CONELOK maintains its locking action through many re-applications. . . . It is adaptable to high, and low torque assemblies ... to high torque stop-nut applications . . . and may be obtained in sizes from No. 10 to 11/2", Full and Thick dimensions are "Standard".



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It takes more than equipment, no matter how modern, to perform the complex heat treating processes required today to achieve the property specifications of many metals.

Without the proper combination of operational skill and technical knowledge developed by years of experience, even the most mechanical, up to date equipment can become a menace to your product and a destroyer of your business.

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Syracuse Heat Treating Corp.
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This Advertisement is Sponsored By the Companies Listed Above-Members of the Metal Treating Institute.

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Protective Coats

Neoprene protective coatings are the subject of a bulletin. These coatings can apply in exceptionally heavy layers. Thus, they are highly economical. (Atlas Mineral Products Co.)

For free copy circle No. 21 on postcard

Lighting Control

Non - interlocking type lighting controls are featured in a bulletin. They control lamp intensity. (Ward Leonard Electric Co.)

For free copy circle No. 22 on postcard

Water Chillers

Packaged water chillers for air conditioning and industrial cooling are outlined in a 16-page brochure. (Industrial Div., American Radiator & Standard Sanitary Corp.)

For free copy circle No. 28 on postcard

Rotary Pumps

Heavy-duty internal gear rotary pumps are dealt with in a bulletin. Pumps range up to 1000-gpm capacity. (The Deming Co.)

For free copy circle No. 24 on postcard

Chart Recorder

Electronic circular chart flowrate recorders and controllers are covered in five specification sheets. (Fischer & Porter Co.)

For free copy circle No. 25 on postcard

Ceramic Insulator

A 4-page bulletin features a new high-temperature ceramic insulator for hermetic sealing of electronic and other equipment. The material resists thermal shocks, displays good electrical characteristics at -325 to +1000°F. (Consolidated Electrodynamics Corp.)

For free copy circle No. 28 on pestcard

Fasteners

Standard, special, aircraft and packaged fasteners are illustrated in a 12-page folder. It also shows cold heading facilities of a big fastener producer. (Midland Screw Corp.)

For free copy circle No. 27 on postcard

Carbide Tools

Carbide blanks, inserts, tools and tool holders are reviewed fully in a 52-page catalog. A complete price list accompanies it. (Sandvik Steel, Inc.)

For free copy circle No. 28 on postcard

Motors, Controls

A huge inventory of new motors. controls and transformers is offered in a catalog. Another lists an extensive line of NEMA frame, ball bearing motors selling 25 pct below cost. All motors are new. (Ajax Electric Motor Corp.)

Por free copy circle No. 29 on pestcard

Industrial Trucks

An industrial trucks selector guide may help vou set up new-or help revise old-systems to meet your own requirements. More than 150 models for virtually all types of work appear in this 20-page guide. (Automatic Transportation Co.)

For free copy circle No. 30 on postcard

Data Processing

Basic data processing features of a general purpose computer are outlined in a brochure. It describes operation of the control panel and a simple 16-part command table. Its punched tape reader reads 200 characters a second. (Royal McBee Corp.)

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Closed-circuit TV

Closed-circuit television equipment is shown in an 8-page bulletin.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 3/26/59

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THE IRON AGE, March 26, 1959

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FREE LITERATURE

It describes actual setups now in use (e.g., a camera on a whirling centrifuge to watch destructive testing of parts). (Kin Tel Div., Chou Electronics, Inc.)

For free copy circle No. 32 en postcard

Machining Aluminum

Hints and other data on machining aluminum are contained in a 32-page booklet. Proper speeds, feeds, cutting compounds, etc. are covered. Charts review: turning. milling, shaping, planing, drilling, reaming, tapping, filing and sawing. (For free copy write on company letterhead to Reynolds Metals Co., Dept. PRD-3, Box 2346, Richmond 18, Va.)

Arc Welding

Industrial applications of magnetic-flux, gas shielded arc welding are discussed in a 12-page booklet. Tables compare this method with conventional electrode welding. (Linde Co.)

For free copy circle No. 33 on postcard

Hot-water Boiler

Hot water boiler design is discussed in an 8-page publication. It details a new hot water heating boiler unit. This comes in 18 sizes from 500,000Btu/hr to 20,000,-000 Btu/hr. (Orr & Sembower, Inc.)

For free copy circle No. 34 on pestcard

Draft Fans

A new induced draft fan reduces stack maintenance costs while improving combustion in either handfired or mechanically-fired boilers. A 4-page bulletin gives details. Also discussed: an air-cooled fan wheel that works at up to 800°F. (Lehigh Fan & Blower Div., Fuller Co.)

For free copy circle No. 35 on postcard

Pumps

Pumps introduced in a bulletin meter chemicals in minute volumes against pressures. It's the first published information on these pumps for chromatographic analyses. The pumps meter down to 3 ml/hr with ±2-pct accuracy. (Milton Roy Co.) For free copy circle No. 36 on postcard

Ductile Castina

How a foundry makes large backwash valves from ductile iron is told in a 4-page company publication. It explains assets of a dry sand molding method. (Kutztown Foundry & Machine Corp.)

For free copy circle No. 37 on postcard

AC Motors

Selection data on alternating-current motors is included in a bulletin. Motors range from one through 200 hp. (Reliance Electric & Engineering Co.)

For free copy circle No. 38 on postcard

Special Typewriter

Now you can use a standard manual or electric or proportionalspacing typewriter for special symbols and characters needed in technical fields like electronics. A new booklet shows how interchangeable typewriter type enables typing of many complex symbols, equations and formulae. Type snaps right into place in one, simple operation. (Remington Rand Div., Sperry Rand Corp.)

For free copy circle No. 25 on postcard

Charging Equipment

Mechanical charging equipment for foundry use appears in a 28page booklet. More than a mere enumeration of up-to-date melting department products, it contains helpful hints for selecting proper equipment for any particular job. (Whiting Corp.)

For free copy circle No. 40 on postcard

Wear-in Compound

Effectiveness of a new wear-in compound is discussed in a bulletin. The compound eliminates damage due to improper breaking-in of new or rebuilt machinery. It's also a lubricant for other machine shop jobs. (The Alpha-Molykote Corp.) For free copy circle No. 41 on postcard

THE IRON AGE, March 26, 1959



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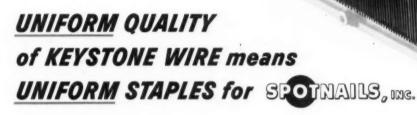
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Spotnails, Inc., Evanston, Ill. and Los Angeles, Calif., produces quality staples by the millions for use by building, crating, millwork and furniture industries. Mass production of these low-cost fasteners demands a quality wire that runs all day without a moment's trouble... and produces a staple with correct temper and uniformity for perfect continuous operation in automatic guns. Keystone galvanized preformed staple wire meets these specifications. Its uniform galvanized coating permits precision forming without flaking, and keeps the machines operating on a continuous basis.

Keystone representatives work with Spotnails designers to produce wire with just the right qualities for mass production and perfect performance. This close, confidential cooperation is available to you, too. Tell us your wire forming problem—we'll help you solve it!

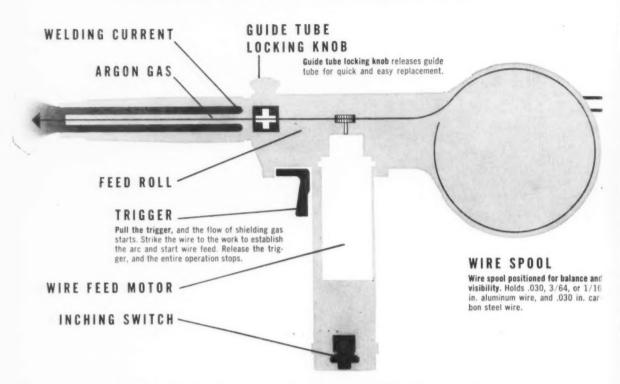
Keystone Steel & Wire Company, Peoria 7, Illinois



KEYSTONE

WIRE FOR INDUSTRY

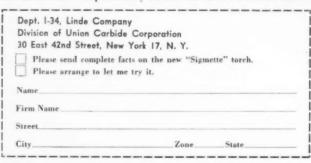
Try Linde's New "SIGMETTE" Torch! -PORTABLE, COMPACT



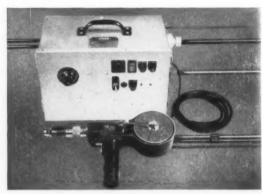
Here's the torch that goes to the job-lets you work in any position . . . in confined spaces . . . at distance remote from the power source!

Designed for Sigma welding of light metals, the "Sigmette" torch is compact and sturdy. Notice the thin silhouette and position of the spool for complete visibility. Torch and control are completely insulated and grounded—the operator is protected from electrically "hot" parts. And the only maintenance tool needed is a screwdriver!

Find out how Linde's new "Sigmette" torch can speed your operations, bring new economies through its advanced design features. For a free demonstration and detailed information, mail the coupon today or call the nearest Linde Office.



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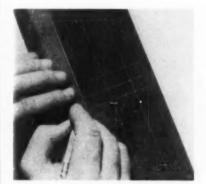


Complete unit — torch weighs 3 pounds, 1 oz.; control weighs 19 pounds, 2 oz.; Current rating, 125 to 200 amp.; Welding power, direct current reverse polarity



TH

New Materials and Components



Precision Ground Tool Steel Is Air Hardening

Particularly suitable for plants and shops which have limited hardening facilities, this precision ground, air hardening tool steel is pre-colored maroon. Pre - coloring eliminates costly cleaning, coloring and drying time necessary for marking ordinary flat stock. This stock resists rust, requires no greasing or degreasing, is permanently identi-

fied by its color. It's available at no increase in cost over plain precision ground flat stock. Pre-coloring provides a high degree of clarity in layout and the color doesn't affect its heat treatment. Available in nearly 250 sizes from ½ x 1 in. in 18-in. lengths, the steel has outstanding freedom from hardening distortion. (Brown & Sharpe Mfg. Co.)

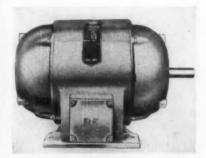
For more data circle No. 42 on postcard, p. 165



Strainers Protect Moving Parts in Equipment

Of plastic construction, new fluid strainers protect moving parts of process equipment. Housing, strainer and gasket of the units are polyvinyl chloride. The PVC strainers trap particles which could be hazardous to internal moving parts of various systems and equipment. Their extremely light weight permits installation directly on delicate equipment. Each strainer element is readily accessible for cleaning or replacement. Sizes range from ½ through 2 in. with either socket weld ends for solvent weld connections or molded thread ends. (Vanton Pump & Equipment Corp.)

For more data circle No. 43 on postcard, p. 165

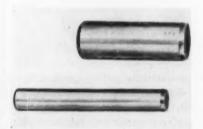


Crane-Hoist Motors Lift Heavy Loads Smoothly

Smooth, safe starts with heavy loads is a key asset of new crane-hoist duty motors. Motors fit bridges, trolleys, hoists, etc., where-ever high slip, high torque are necessary. Secret of motors' success is their special windings. These windings can be built into squirrel cage, multi-speed, fluid-shaft and

slip ring wound rotor motors. Crane-hoist motors come in ½ through 50-hp, 182 through 365U frame sizes, drip-proof or totally enclosed 15-minute or 30-minute duty ratings. All have lightweight cast aluminum frames. (Reuland Electric Co.)

For more data circle No. 44 on postcard, p. 165



Dowel Pins Are Heat Treated Steel

Dowel pins for machine tool and die uses now come in heat-treated alloy steel, sizes from ½ to 1 in. Pins have a 60 to 64 Rc surface hardness with an 8 rms maximum microinch finish to assure accurate positioning to close tolerances.

Standard pins are ground 0.0002 in. over listed diameter for press fit between mating parts, with "oversize" pins ground 0.001 in. over listed diameters for repair work. (Tolerances are ± 0.0001 in.) (Safety Socket Screw Co.)

For more data circle No. 45 on postcard, p. 165

layout and template making time cut in half...



THE NEW STRIPPIT FLEX-O-DRILL

- ullet Drills, reams, scribes, center punches to $\pm~0.002''$ WITMOUT base line drawing or height gauge layout!
- EASY, ACCURATE POSITIONING—quickly set to any reference point and to nearest 0.100" by adjustable steel tapes reading in both directions from zero. Micrometric gauges then bring settings to nearest 0.001". No optical scanning device needed.
- LASTING ACCURACY! Table is an actual ground surface plate.
 Bridge assembly is of heavy, accurately machined castings. Lead screws are precision ground and engaged only during micrometric gauge settings to minimize wear. All parts are corrosion-resistant. Bearings are protected against dust and chips by felt shields. Drill motor is heavy-duty industrial type.
- 1/4" CAPACITY in mild steel stock up to 24" width, any length.
- ALSO A PROVEN MONEY-SAVER on pilot runs, low unit production.



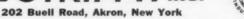
Template drilled by Flex-O-Drill

Layout scribed by Flex-O-Drill

Flex-O-Drill work piece

WRITE FOR LITERATURE TODAY, and an actual demonstration at your plant:

WALES STRIPPIT INC.



In Canada: Strippit Tool & Machine Company, Brampton, Ontario

DESIGN DIGEST

Bearings

Self-aligning plain bearings now available need no maintenance or service. They're for uses requiring low coefficiency of friction, long service life without lubrication and high dynamic load-carrying capacity. The bearings have a very high

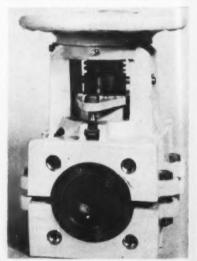


load safety factor. A wide variety of plain or rod end types come in 3/16 to 6-in. diam. bore sizes. Materials include: chrome alloy steel, stainless or plastics. (Southwest Products Co.)

For more data circle No. 46 on postcard, p. 165

Graphite Valve

A new impervious graphite globe valve has a non-rotating spindle. It features a seat of carbon and Teflon



to eliminate galling and sticking. A sliding spindle eases sealing-off of the valve packing. It adapts the valve to motorized, automatic operation. Packing material could also be asbestos, braided Teflon plastic, asbestos impregnated with Teflon plastic or a variety of elastomers. All provide excellent sealing for long periods. Available initially in a 2-in. size, the type-G globe valve also will be made in 1, 1½, 3 and 4-in. sizes. Designed for up to 100-psi service, the valve has a steel casting enclosing its body to prevent damage from external mechanical shock. (National Carbon Co.)

For more data circle No. 47 on postcard, p. 165

High-heat Screw

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Self locking, a high-temperature screw is for supersonic jobs at temperatures to 1200°F. The screw includes an all-metal rolled tubular insert. Torque action compresses this insert. Resiliency of the tube re-forms the insert, locking the



screw. Also vibration resistant, the fastener provides weight-saving by eliminating lock washers and safety wire. Screws come in No. 2 sizes up, minimum thread length ½ in., for aircraft or commercial applications. (Long-Lok Corp.)

For more data circle No. 48 on postcard, p. 165

Jig Borer Control

Two new jig boring machines position and operate via a telephone dial system. The borers take work-pieces up to 70-in. high, a part up to 125-in. diam and bore to the center of an 80-in. diam workpiece. Both jig borers have 4-ft rotary tables. They tower 16 ft above the floor. Weight is more than 26 tons each. The borers use an electronic measuring system. They run either by perforated tape or a new positioning system commanded by a telephone dial. Using the dial, the operator reads the machine settings.

DESIGN DIGEST

He dials them like he would a telephone number. Then the machine's electronic system takes over. Within 20 seconds after dialing, the ma-



chine positions itself, double checks settings and is ready for operation. (Pratt & Whitney Tool Co.)

For more data circle No. 49 on postcard, p. 165

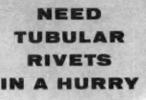
Temperature Monitor

Capable of monitoring virtually unlimited numbers of points continuously is this thermistor temperature sensing system. Highly flexible, compact and simple in operation, the monitoring system detects and furnishes warning when the temperature at any protected point reaches a preselected high or low



limit. Applications therefore include monitoring bearing temperatures in generators, turbines, pumps and other rotating equipment, as well as temperature protection for processes, processing equipment, pipelines, and all types of industrial installations. The system can monitor between —25 and +600°F. (Fenwal Inc.)

For more data circle No. 50 on postcard, p. 165





NEW ENGLAND DIVISION Milford, Connecticut (Trinity 8-1761)



PENN DIVISION Hatboro, Pennsylvania (Osborn 5-4560)



ILLINOIS DIVISION
Aurora, Illinois (Aurora 2-4278)



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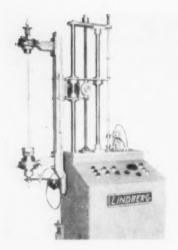
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New Equipment and Machinery



Zone Melt Unit Produces Ultra Pure Metals

Ultra high purity metals are produced on this vertical floating zone scanner. It can accurately scan at a continuously variable 0-10.6 iph. Return speed range is a continuously variable 40 to 800 in per hour. Top and bottom holders adjust in both a horizontal and a vertical position. This means easy material and seed centering. A separate top adjustment is provided for aligning the quartz tube. The mechanism can handle various diameter quartz tubes, with suitable adapters,

up to 35-mm OD. A unique method water cools the quartz tube; it allows use of a single wall tube, thereby keeping space between the work coil and work as small as possible for highly efficient operation. Fully automatic, the mechanism can be set up to traverse a predetermined length at a pre-set speed and return at a pre-set speed to the starting position and repeat cycle. (Lindberg Engineering Co.)

For more data circle No. 51 on postcard, p. 165

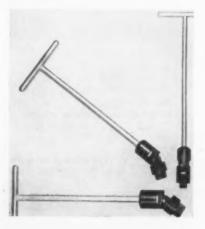


Arbor Spacers Cut Setup Time, Eliminate Scrap

Machine operators now can cut setup time in half and practically eliminate scrap. That's the word from the producer of new, precise, adjustable micrometer arbor spacers. Primarily for use in straddle milling, they also find uses with raising blocks, fixture spacers, gage sets, and stops for milling machines, lathes, drill presses, turret lathes and die jacks. The arbor

spacers each have one thousandth graduations. They make it unnecessary to use shimstock and/or paper as a means of spacing. Spacers come in 3/8 to 11/2-in. widths and larger sizes up to 5 in. can be made on special order. Narrow sizes have 1/16-in. adjustment; wider sizes, 1/4-in. adjustment. (Mayer Engineering & Mfg. Co.)

For more data circle No. 52 on postcard, p. 165

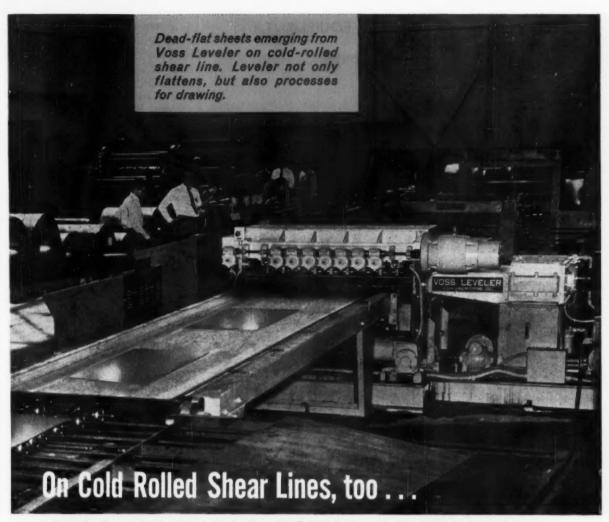


Universal Wrenches Speed Hard To Reach Jobs

Socket head cap screw wrenches in a new design speed-up wrench work in hard to reach areas. The small wrenches reach places normally inaccessible by standard type Allen wrenches; they permit a full turn without resetting the wrench in the cap screw head. Now available in five sizes, the universal tools have yokes milled from solid steel blanks. Each yoke is small enough to enter the counterbore of the cap screw it's applied to. The handle is in-

tegral with the universal, eliminating slipping. This also means no looking for two tools instead of one. Over-all length of the lightweight wrenches is approximately 51/4 in. The original wrench design grew out of the manufacturer's own need for such a tool. Its merits have been proven by several years' use in the company's wrenching operations. (Abington Machine Co.)

For more data circle No. 53 on postcard, p. 165



VOSS LEVELERS EQUAL OR EXCEED STRETCHER-LEVEL FLATNESS

Voss Inverted Roller Levelers are giving the same high performance on cold-rolled steel as they do on galvanized and hot-rolled products. One large producer reports that sheets from 85% of a light-gauge cold-rolled coil are leveled to stretcher-level flatness. Furthermore, this same operator has reduced rerolling by 25%.

Another example: A maker of wall panels eliminates time-consuming inspection and sorting of individual sheets for flatness. By leveling them with a Voss, he automatically assures panel flat sheets

without further checking.

User after user tells of increased quality and lowered costs resulting from Voss Roller Levelers. Voss-patented exclusive design features assure extreme flexibility of application and precise area control on any section of a sheet or coil. Whatever your application—galvanized, hot or cold-rolled, strip, coils, sheets or plate, ferrous or non-ferrous—Voss has a quality-making, profit-making story for you. Write today for detailed information and a list of users.



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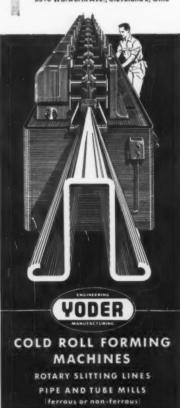
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NEW EQUIPMENT

Computer System

Computers now "talk" to one another, thanks to a new computer language translator system. It translates technical information from one computer or data processing system to another. The unit converts data from the Semi-Automatic Ground Environment (SAGE) system into IBM 709 data or from IBM 709 data into Teletype transmission or

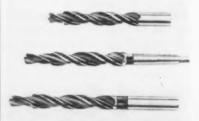


from IBM 709 into various punch card formats. The computer translator is more than just a translation system for integrating various formats, media or codes of data processing systems. It also can expedite data or conserve computer time. The unit can increase speed of processing of data or decrease it in order that it can be fed into various types of input or output equipment. (Electronic Engineering Co.)

For more data circle No. 54 on postcard, p. 165

Standard Drills

One manufacturer's drills are now available in all practical standard sizes for drilling and chamfering



operations prior to tapping. The standard drills come in all tap sizes from 10-24 to \%-18 NC and NF, in

three step lengths and three shank styles. Drill sizes were selected to best suit the industry-wide acceptance of unified standards and hole tolerances. (Mohawk Tools, Inc.)

For more data circle No. 55 on postcard, p. 165

Countersink

Countersinks are available with depth of cut accuracy within fixed limits of ± 0.001 in. The same precision is possible in deburring, chamfering, trepanning or removing collars from rivets. Powered by hand drill, drill press, lathe or wherever chucking is available it may be used continuously without excessive heating. (Schrillo Aero Tool Engineering Co.)

For more data circle No. 56 on postcard, p. 165

Plate Feeder

Handling sheets or plates up to 8 x 12 ft., this automatic unit picks-up, aligns and feeds the material into a shearing, forming or blanking press. It picks one at a time from a stack, placing it on a table of driven rolls. The unit aligns



the sheet or plate accurately with the dies, and feeds it into the press. Operation can be either continuous at a fixed cycle, or intermittently as the press operator directs. The machine eliminates costly, dangerous practices like prying plates loose from a stack manually, attaching hooks or grabs, and feeding from a roller table. It obsoletes a "gang" operation, letting one man do the whole job. It handles 3½-ft minimum, 8-ft maximum width; 7½-ft minimum, 12-ft maximum length. (Herr Equipment Corp.)

For more data circle No. 57 on postcard, p. 165

Pipe Cutter

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165 959 Pipe cutting and beveling at high production rates is this unit's job. It cuts materials ranging from hard ferrous to soft nonferrous or nonmetallic pipe. The unit handles from ½ through 16-in. sizes. Its high-speed abrasive saw, plus moderate speed pipe rotation, prevents heat accumulation. Thus it eliminates crystallization and oxydiza-

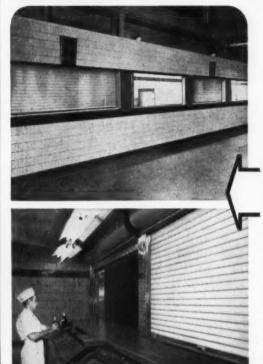


tion. The unit needs no coolants. Studies indicate the machine cuts pipe joint preparation costs by 20 to 80 pct, depending on pipe material and size. Materials such as Hasteloy, stainless steel, mild steel and aluminum can be indiscriminately intermixed on the cutting schedule with no loss of production time. (James Mitchell & Co.) For more data circle No. 58 on postcard, p. 165

Numerical Control

Numerical control systems just unveiled can run nearly any type machine tool, either as new equipment or for retrofit. Initially, the manufacturer isn't offering point-topoint positioning control systems. Later plans, however, call for continuous path and rotary table positioning systems as well as super accurate automatic inspection machines. First system is expected to compete favorably with other low cost systems. A second will be a more advanced, two-axis digital system. Both will allow manual, semi - automatic or fully-automatic machine tool operations. (Norden Div., United Aircraft Corp.) For more data circle No. 59 on postcard, p. 165

Best answers to these increasing needs:



Kinnear Rolling Counter Shutters

The vertical "coil-away" action of the Kinnear-originated curtain of interlocking metal slats is the ideal counter shutter. Its spacesaving efficiency and protection have been proved in service openings of every kind. In addition to a variety of contoured slats, Kinnear also offers the popular "midget" slat, with a flat exterior face, specially designed for counters up to 20 feet wide.

Kinnear Rolling Grilles

The Kinnear Rolling Grille, an attractive openwork of metal bars and links, is also widely used as a barricade for counters, doorways, corridors, or to confine activities to sections of any room or building area. It features the same, spacesaving, coiling upward action of the Kinnear Rolling Doors and Counter Shutters.



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WELDING SHOW

Welding Engineers Meet at Chicago

■ Engineers from all over will converge on Chicago next month to visit the 40th Annual Convention and Welding Show of the American Welding Society. Technical sessions will be at the Sherman Hotel, the Welding Show at the International Amphitheatre.

Technical sessions sponsors are the American Welding Society and the American Institute of Electrical Engineers. Papers cover a wide field, from nuclear power equipment to ultrasonic welding.

The program follows:

AMERICAN WELDING SOCIETY

40th Annual Meeting

Technical Sessions

Mon., Apr. 6-10:00 a.m.

Session in Assembly Room:

Official opening and business session; Chairman, J. E. Dato, Linde Co.

Address by G. O. Hoglund, AWS President followed by national awards.

Adams Lecture: The Science of Arc Welding, by Clarence E. Jackson, Linde Development Lab.

Mon., Apr. 6-2:00 p.m.

Session in Assembly Room:

Nuclear-power equipment papers:

Welding of Equipment for Dresden Nuclear-Power Station, by W. R. Smith, General Electric Co.

Fabrication and Construction of Piping System for Dresden Nuclear Power Station, by G. B. Grable and A. M. Croswell, Bechtel Corp.

Welding of Containment Sphere for Dresden Nuclear Power Station, by Perry C. Arnold, Chicago Bridge & Iron Co.

Session in Louis XVI Room:

Processes and procedures:

Practical Welding Procedures, by Stanley I. Roberts and Clarence E. Cole, Portsmouth Naval Shipyard.

Control of Process Variables— Key to Successful Welding of Foil, by John Campbell, Air Reduction Research Lab.

Oxyacetylene Pressure Welding of High-Speed Rocket Test Track, by E. S. McKittrick, E. S. McKittrick, Contractor, and W. E. Donalds, Linde Co.

Session in Bernard Shaw Room:

Stainless steels:

Elevated-Temperature Properties of Modified Type 347 Weld Metals, by Thomas J. Moore, Arcos Corp.

Welding Properties of Cr-Ni-Mo Hardenable Stainless Steels, by Robert H. Kaltenhauser, Allegheny Ludlum Steel Corp.

Corrosion of Stainless - Steel Welds Formed with Carbon-Dioxide Shielding, by B. E. Hopkinson and D. W. McDowell, Jr., International Nickel Co.

Tues., Apr. 7—9:30 a.m.

Session in Bernard Shaw Room:

Arc - welding power supplies (Sponsored by the AIEE committee on Electric Welding):

Characteristics of Rectifier-Type

High-Current DC Supplies for New Welding and Arc Processes, by Robert Stuefen, A. O. Smith Corp.

Design Precautions for Proper Application of Silicon Rectifiers to Arc and Similar High-Transient Voltage and Current Loads, by Dennis Pierce, A. O. Smith Corp.

A Report on the Revitalization of the Multiple - Operator Power Source Welding System, by William Faust, A. O. Smith Corp.

Session in Assembly Room:

Nuclear-power equipment:

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Welding of Inconel for Nuclear-Power Applications, by William F. Fragetta and George R. Pease, International Nickel Co.

Brazing Stainless-Steel Fuel Elements for Nuclear Reactors, by Peter P. King and Robert K. Mc-Geary, Westinghouse Atomic Power Dept.

Welding of Nickel-Molybdenum Alloys, by G. M. Slaughter, Peter Patriarca and R. E. Clausing, Oak Ridge National Lab.

Session in Louis XVI Room:

Cutting:

Cybernetics of Oxygen Cutting, by R. L. Deily, Messer Cutting Machines, Inc.

Recent Metal Removal Developments with Carbon - Arc Compressed-Air Process, by Myron D. Stepath, Wm. J. Coughlin and Homer B. Nelson, Arcair Co.

Tungsten-Arc Cutting of Stainless-Steel Shapes in Steel-Warehousing Operations, by John D. Wait, Morrison Steel Co.

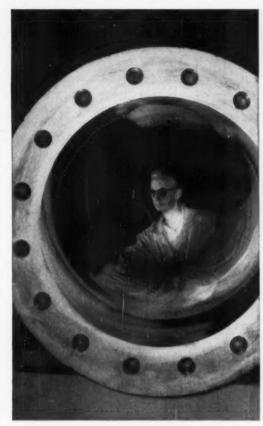
Tues., Apr. 7-2:00 p.m.

Session in Bernard Shaw Room:

Welding-arc fundamentals (Sponsored by the AIEE committee on Electric Welding):

An Analysis of Transfer in Gas-Shielded Welding Arcs, by W. J. Greene, Air Reduction Co.

The Measurement and Significance of Temperature in Welding









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PROGRAM

Arcs, by Howard C. Ludwig, Westinghouse Electric Corp.

A New Magnetic Arc Method for the Electric Welding of Refractory Glasses and Ceramics, by E. M. Guyer, Corning Glass Works.

Session in Louis XVI Room:

Pipe lines:

Automatic Submerged-Arc Welding on the Pipe Line, by William B. Handwerk, M. J. Crose Manufacturing Co., Inc.

Maintenance Welding of High-Test Line Pipe, by F. W. Zilm and A. M. Hill, Service Pipe Co.

Welder Qualification Requirements for Pipe-Line Welders, by Robert S. Ryan and Robert W. Wright, Columbia Gas System Service Corp.

Sessions in Assembly Room:

Heat effects on steel weldments:

Effect of Residual Stress on Brittle Fracture, by Koichi Masubuchi, Transportation Technical Research Institute, and Hiroshi Kihara, University of Tokyo.

Effect of Heat Treatment and Fabrication on Heavy-Section Pressure-Vessel Steels, by A. I. Rubin, Pratt and Whitney Aircraft, R. D. Stout, Lehigh University, and J. H. Gross, United States Steel Corp.

Cast-Pin Tear Test for Susceptibility to Hot Cracking, by Frederick C. Hull, Westinghouse Research Laboratories.

Wed., Apr. 8-9:30 a.m.

Session in Bernard Shaw Room:

Resistance welding (Sponsored by the AIEE committee on Electric Welding):

The Effect of Elevated Temperatures on Flash-Welded Aluminum-Copper Joints, by C. R. Dixon and F. G. Nelson, Aluminum Company of America.

Discussion of Direct-Writing Instrumentation for Certain Applications in the Field of Resistance Welding, by W. K. Whittemore, Brush Instruments.

A Direct-Reading RMS Meter for Measuring Secondary Resistance-Welding Current, by E. F. Nippes, Hugo S. Ferguson, and Warren F. Savage, Rensselaer Polytechnic Institute.

Session in Assembly Room:

Brittle fracture (Sponsored by the Ship Structure Committee):

Micromechanism of Brittle Fracture in Low-Carbon Steel, by G. T. Hahn, B. L. Averbach, M. Cohen, Massachusetts Institute of Technology and W. S. Owen, University of Liverpool.

Prestrain, Size, and Residual Stresses in Static Brittle-Fracture Initiation, by C. Mylonas, Brown University.

Brittle-Fracture Tests of Steel Plates Containing Residual Compressive Strain, by W. J. Hall, N. M. Newmark and S. T. Rolfe, University of Illinois.

Session in Louis XVI Room:

Design considerations:

Development of Welded Steel Lathe, by Gordon M. Sommer, Clearing Machine Corp.

Some Consideration on Design for Fatigue in Welded Structures, by J. Koziarski, The Martin Co.

Practical Approach to Determine Weld Size, by Omer Blodgett, The Lincoln Electric Co.

Wed., Apr. 8-2:00 p.m.

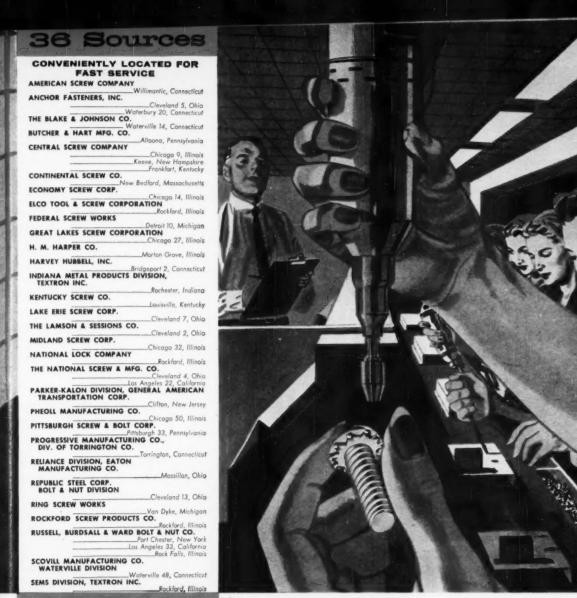
Session in Assembly Room:

Welding in ship structures: (sponsored by the Ship Structure Committee):

An Investigation of Welded Crack Arrestors, by Robert J. Mosborg, University of Illinois.

Isotope Techniques for Inspection and Evaluation of Ship Welds, by E. L. Criscuolo, Naval Ordnance Laboratory.

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Welds with Scattered Gamma Radiation, by J. I. Bujes, U. S. Naval Ordnance Test Station.

Session in Bernard Shaw Room:

Resistance and ultrasonic welding:

Roll-Spot Welding of Ballistic Missiles, by James K. Dawson, Redstone Arsenal. Internal Stress Distribution of Single Spot Welds in Relation to Their Fatigue Life, by Georges Welter and Andre Choquet, Ecole Polytechnique.

Fundamental Studies of Ultrasonic Welding, by R. E. Monroe, N. E. Weare and J. N. Antonevich, Battelle Memorial Institute.

Session in Louis XVI Room:

Titanium and zirconium:

Vacuum Diffusion Joining of Titanium, by Earl J. Clark, General Electric Co.

Quartz-Lamp Radiant Brazing of Titanium-Alloy Honeycomb Sandwich Panels, by John F. Rudy, H. Schwartzbart and R. M. Necheles, Armour Research Foundation.

An Evaluation of the Diffusion-Bonding Characteristics of Zircaloy-2, by William Feduska, Westinghouse Electric Corp.

Thur., Apr. 9-9:30 a.m.

Session in Bernard Shaw Room:

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Welded structures:

Welding of Reinforcing Bars for Concrete Construction, by John F. Rudy, Frank Suyama and Harry Schwartzbart, Armour Research Foundation.

Welded Cantilever Wedge Beams, by W. J. Krefeld, D. J. Butler and G. B. Anderson, Columbia University.

An Experimental Investigation of Welded Open-Web Beams, by A. A. Toprac, University of Texas, and B. R. Cooke, Texas Highway Dept.

Session in Louis XVI Room:

Weldability of steel and cast iron:

Development of Techniques for Submerged-Arc Welding HY-80 Steel, by Wallace J. Lewis, G. E. Faulkner and P. J. Rieppel, Battelle Memorial Institute.

Welding of Medium-Alloy Chrome-Moly Steels, by Kenneth R. Notvest, The Flori Pipe Co.

Process Welding of Nodular and Gray-Iron Castings, by Ellis O. Porter and Benjamin Townshend, General Electric Co.

Session in Crystal Room:

Aluminum alloys:

New Developments in the Welding of Aluminum, by R. L. Hackman, Linde Co.

Techniques for Welding Al-Mg Alloys, by Daniel M. Daley, Jr., Army Ballistic Missile Agency.

Certain Structural Properties of Ultrasonic Welds in Aluminum Al-



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PROGRAM

loys, by J. Byron Jones and W. C. Potthoff, Aeroprojects Inc.

Fri., Apr. 10-9:30 a.m.

Session in Bernard Shaw Room:

Welded structures:

The Buffalo Bayou Bridge and Future Long-Span Possibilities, by Charles S. Matlock and Farland C. Bundy, Texas Highway Dept.

The Hampton Road All-Welded Steel Arch Bridge, by Wm. Llewellyn Powell, Powell & Powell, Milton E. Eliot, Mosher Steel Co., Douglas A. Nettleton, Texas Highway Dept., and Joe C. Bridgefarmer, Civil Engineer.

Design Details for Welded Highway and Railway Bridges, by Marcello H. Soto, Gannett Fleming Corddry & Carpenter, Inc.

Session in Louis XVI Room:

Gas-shielded welding:

Progress Report on the Flux-Cored Electrode Welding Process, by A. F. Chouinard and J. A. Howery, National Cylinder Gas Div. of Chemetron Corp.

Dip Transfer CO₂ **Welding,** by Roger W. Tuthill, Air Reduction Co.

Gas-Shielding Mechanism in Welding Arcs, by R. M. Gage and E. F. Stresino, Linde Co.

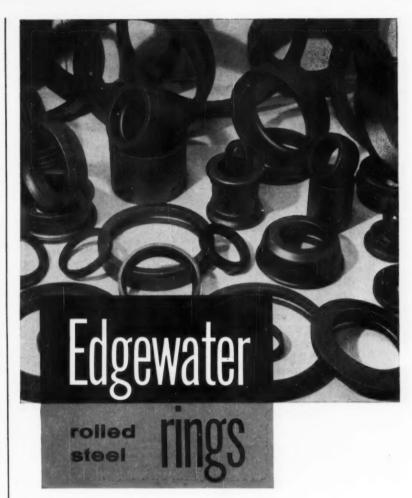
Session in Crystal Room:

Brazing:

Heat-Extractive Brazed Bimetals Show Promise for Missile and Industrial Applications, by Robert C. Bertossa, Pyromet Company, and Steven Rau, Stanford Research Institute.

Effects of Hydrogen Brazing on Properties of High-Temperature Alloys, by G. S. Hoppin, III, and E. N. Bamberger, General Electric Co.

Metallurgy of Bonding in Brazed Joints, Part II, by Nikolajs Bredzs and Harry Schwartzbart, Armour Research Foundation.



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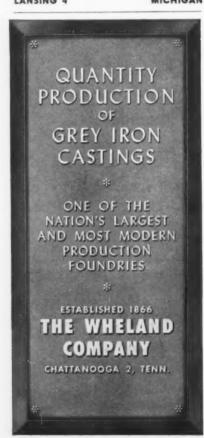
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merson Eectric Mfg. Co. utectic Welding Alloys Corp. xomet, Inc.		500
Exomet, Inc		504
& N Metal Products Inc.		629
enway Machine Co		326
ibre-Metal Products Co		434
Frommelt Industries	***	805
General Dynamics Corp., Liquid Ca.bonic Div		C23
Liquid Cardonic Div.		021
General Electric Co		802
Glendale Optical Co., Inc.		311
Goss Gas, Inc		117
Handy & Harman		204
Harnischfeger Corp.	***	425
The Harris Calorific Co		
Hobart Brothers Co		
Robt. W. Hoffman Company, Inc		633
Robert Holmes & Bros. Inc.		609
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Industrial Research Laboratory		
International Nickel Co		323
Jackson Products Air Reduction Sales Div., Air Reduction Co., Inc		F36
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K S M Products, Inc.		320
Kaiser Aluminum & Chemical Sales, Inc		
Kedman Co		
Kennametal, Inc		
Lenco, Inc		
The Lewis Welding & Engineering Corp		
Lincoln Electric Co		411
Linde Co. Div., Union Carbide Corp		
McKay Co		321
Magnaflux Corp		
Marquette Manufacturing Co., Inc		914
The Metal Removal Co		317
Metal & Thermit Corp		
Metallizing Co. of America		804
Mid-States Welder Mfg. Co		800
Miller Electric Mfg. Co., Inc		
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Modern Engineering Co		
National Cylinder Gas Div.		
Chemetron Corp		730
National Torch Tip Co		617
Nelson Stud Welding, Div.,		
Gregory Industries, Inc.		
Ohio Nut & Bolt Co	7	700-A
OXO Equipment Co		. 216
Page Steel & Wire Div.,		E 9.0
American Chain & Cable Co., Inc		
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Cecil C. Peck Co		
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Precision Welder & Flexopress Corp	807
Done Controls Co. Div.	
Air Reduction Co., Inc.	511
J. M. Ragle Industries	911
Reid Avery Co	507
Robotron Corp	520
Robvon Backing Ring Co	901
Sellstrom Mfg. Co	
Sight Feed Generator Co	433
Simonds Abrasive Co	130
Singer Glove Mfg. Co	126
A. O. Smith Corp	122
Smith Welding Equipment Corp	712
Sperry Products Inc	225
Square D Co	232
Steffan Mfg. Corp	715
Stoody Co	316
Storch Products Co., Inc	800
Sylvania Electric Products, Inc	907
The Taylor-Winfield Corp	512
Tec Torch Company, Inc	220
Tempil Corp	
Tweco Products, Inc	
Uniflex Cable Div	634
Unique Equipment, Inc	604
United Wire & Supply Co	526
Vacuum Tube Products Co., Inc	325
Victor Equipment Co	620
The Webb Corp	917
Welding Alloy Mfg. Co	903-A
Martin Wells, Inc	333
Weltronic Co	721
Westinghouse Electric Corp	100
Worthington Corp	235

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NEW FILMS

"Resistance Welding Stainless Steel" makes use of diagrams, illustrations and pictures of actual equipment at work. 21min. 16mm, color, sound. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

"Futures in Steel" is a pitch at students looking for a career. This film is a highly effective piece of good propaganda which begins deep in the past and pushes far into the future. Its glimpses at early American ironmaking alone are enough to make veterans proud. But its romantic handling of tomorrow's technology today is what really sells the audience at which it aims. 28min. 16mm, color, sound. (Sponsored by Bethlehem Steel Co.) Modern Talking Picture Service, 3 E. 54th St., New York 22.

"Structural Welding" features the construction of a modern research

laboratory. 15min. 16mm, color, silent. Air Reduction Co., 150 E. 42nd St., New York 17.

"Pure & Simple" covers industrial waste and water conservation. Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

"Assembly of Body Bolts" is a film on work simplification. It shows how one firm speeded of assembly work. 10min. 16mm, color, sound. \$9 rental fee. Industrial Management Society, 330 S. Wells St., Chicago 6, Ill.

"Iron Ore from Cerro-Bolivar" is a documentary on the discovery, development, and operation of an iron ore mine in Venezuela. 21min. 16mm, sound, Kodachrome. Film Distribution Center, U. S. Steel Corp., 71 Broadway, New York 6, N. Y.

"Teamwork" is the pictorial story of tool steel—what it is and how it should be used. One of its most colorful scenes shows forging of tool steel. 30min. 16mm, color, sound. Bethlehem Steel Co., Publications Dept., Bethlehem, Pa.

"Inclinable Press Maintenance" is for viewing by preventive maintenance pullers. It shows the correct way to set up a new press and how to keep it in good shape. 25mm, color, sound. E. W. Bliss Co., Advertising Dept., 1375 Raff Road, S.W., Canton, Ohio.

"This New World of Metals" guides the onlooker through one of the newest pilot production facilities for research, development, and processing of new metals and alloys. 20min. 16mm, color sound. Westinghouse Electric Corp., Motion Picture Dept., 3 Gateway Center, Pittsburgh 30, Pa.

"The Armalite Answer" explains how new low-temperature polystyrene insulation boards are made and used. 20min. 35mm strip, sound color. Insulation Div., Armstrong Cork Co., Lancaster, Pa.

WHICH HOIST

fits your plant's needs?



SHEPARD NILES
FLOOR-OPERATED HOIST



SHEPARD NILES
CAB-OPERATED HOIST

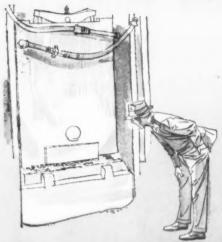
Operator primarily occupied with other duties. Uses hoist for fast, efficient handling of relatively short hauls. Operator in cab moves loads along at high speeds, occupies best vantage point for spotting and stacking material.

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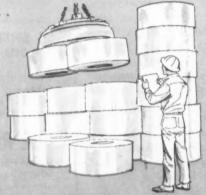
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The Iron Age Summary

Fast Second Quarter Coming Up

Mills and their customers are getting set for fast-and-furious second quarter.

The "big hump" will come in April and May. June will be frantic due to uncertainty of freight car, truck availability.

• Steel mills are getting set for a fast-and-furious second quarter. Second quarter output and shipments probably will set an all-time record as the mills and their customers try to get set for a possible steel strike at mid-year.

At the moment, steel ingot output is being maintained at a high level, but production of finished steel is tending to lag. Some sources say the inexperience of second and third work shifts is responsible. Others feel the mills themselves are building inventories of ingots and semi-finished steel.

Reversal Due — In the second quarter this situation is expected to reverse itself. Semi-finished

inventory will be reduced. Shipments will exceed production. No steel will be available for immediate delivery. Those who have not committed themselves weeks in advance will be out in the cold.

Incoming orders have leveled off at some mills only because there is no point in taking any more orders for shipment before June 30—the steel labor contract deadline. Even so the amount of new orders coming into many mills last week was close to capacity.

Advance Ordering—Many mills will accept orders now for July delivery, and if there is a strike the steel will be shipped when the mills get to it. Quite a few customers are sending in business on this basis.

In fact, big steel users are being pressed hard by steel salesmen to commit themselves for steel far ahead of time. Although on allocation, customers are urged to give releases for the exact tonnage because in many cases they are not taking all they can get. If big steel

customers fail to take all they're entitled to, sales offices must scurry around and offer tonnages to customers previously turned down.

Paradoxical Situations — This leads occasionally to paradoxical situations where steel products that are generally in a very tight position from a delivery standpoint can be delivered relatively quickly.

For example: Mills generally have imposed quotas (allocations) on flat-rolled products. Yet two mills, at least, are reported offering three-week delivery of hot-rolled sheet.

The Big Hump — There is no weakness in the picture, but it is clear the big hump will be centered in May and April. March will be a very good shipping and production month but the following weeks will be even stronger. June, of course, is likely to be frantic in terms of the mills' ability to ship everything they would like to in view of the possibility of freight car and truck shortages.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year	
(Net tons, 000 omitted)	2,642	2,642	2,506	1,366	
Ingot Index					
(1947-1949=100)	163.9	163.9	156.0	85.0	
Operating Rates					
Chicago	94.0	94.0*	90.0	56.5	
Pittsburgh	94.5	94.0*	86.5	57.0	
Philadelphia	97.0	98.0	94.5	57.0	
Valley	84.0	85.0*	91.5	40.0	
West	92.0	91.0	86.0	65.0	
Cleveland	100.0	96.5*	91.0	47.0	
Detroit	98.0	101.0*	93.0	20.0	
Buffalo	105.0	105.0	102.0	37.0	
South Ohio River	94.0	91.0*	95.0	55.0	
South	89.0	90.0	81.0	47.5	
Upper Ohio River	95.5	94.0*	95.0	76.0	
St. Louis	87.5	89.0*	85.0	70.0	
Aggregate	93.0	93.0	88.5	50.6	

*Revised

Prices At a Glance

	This Week	Week	Month Ago	Year
(Cents per lb unless otherwise		Ago	Ago	
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	\$66.41	\$66.41	\$66.41	\$66.49
Scrap No. I hvy				
(Gross ton)	\$40.50	\$40.83	\$43.17	\$35.00
No. 2 bundles	\$27.83	\$28.67	\$30.33	\$26.17
			-0.4	
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	31.50	31.50	30.00	25.00
Lead, St. Louis	11.30	11.30	11.30	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin. Straits, N. Y.	102.75	103.50	103.75	93.875
Zinc, E. St. Louis	11.00	11.00	11.50	10.00

Adhesives Prices Due for Boost

Price increases are expected soon for adhesives based on rubber, synthetic rubber and synthetic resins.

But increased volume and improved production techniques have meant cuts in price for epoxy products.

 Memo to buyers: Prices of many industrial adhesives can be expected to go up as much as 5 to 10 pct in the next few months.

Raw material costs are rising. One firm estimates every 1 pct rise in the cost of materials results in a 3 to 8 pct increase in the price of the finished adhesive.

What's Going Up — Currently, adhesives based on rubber, synthetic rubber, and synthetic resins other than epoxies seem to be due for a price increase, according to

s e v e r a l adhesive manufacturers.

However, this is not the case with epoxy resins. One company reports epoxy prices have been lowered twice in the past six months because increased volume and improved production techniques have taken them out of the "pilot" stage.

Aim for Volume—Why the reductions in epoxy prices? Adhesive manufacturers are out to improve service to customers with special needs, by developing adhesives which will cover a wider number of special applications. They see several advantages in this for the customer and themselves.

An adhesive that can be made to do the jobs of several special adhesives increases the volume for the manufacturer and converts it into a shelf item. When the volume is sufficient to take it out of "pilot" production techniques, a lower price results.

Sales Trend—Sales are up 5 to 10 pct over the same period 1958. And at this same time last year the downturn was just starting for some adhesive producers.

Product Plans—Here are some of the new developments in adhesives:

Manufacturers are seeking new adhesives or methods to simplify application procedures. Honeycomb construction, for example, has generally required heat and pressure to insure a proper bond. A new inexpensive adhesive no longer requires heat and pressure. The bond is obtained through either a roller or just the weight of stacking panels.

In fact, one of the fastest growing markets for adhesives is in the assembly of new types of partitions and curtainwall for commercial and industrial buildings.

Auto and Motor Uses—Another market is the electrical industry where adhesives are being used in magnetic core stator and rotor assemblies used in small motors and transformers.

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Detroit's automakers are experimenting with adhesives for bonding sections of aluminum engine blocks. They believe the aluminum engine blocks will have to be diecast in several sections in order to maintain certain tolerances. New adhesives with heat resistance in the range of 400°F are being used to bond the sections.

Vehicle manufacturing offers a promising field for the not-too-fardistant-future. A number of prototypes of general military supply vehicles are being assembled with adhesives to save weight.



MAKING CONTACT: Rollers are used to bring contact of adhesive coated surfaces in panel assembly. (Rubber & Asbestos Corp. photo.)



This 24-ft, boring mill is facing a disc of 300 stainless ... a difficult machining operation ... but this 3-man team quickly found the answer.



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This 3-Man Team makes expensive machines pay off

Every time some new alloy must be machined, new problems arise as to the best tool, grade of carbide, feeds, speeds and depth of cut to use. Modern mills and machines are too costly to permit a lot of experimenting with resultant downtime.

The only sure and economical way is by pooling the know-how of a 3-man "tooling team." The Tool Engineer knows the job requirements; the Machine Operator contributes his machining skill; and your Kennametal Carbide Engineer provides information on the latest developments in carbide tooling.

Such a 3-man team can best determine the proper

tools required for the job . . . then fill those requirements from the extensive line of Kennametal* tooling. Spearheaded by the Kendex* (patented) line of "throwaway" insert tooling with more than 50 standard styles, plus many adaptations for special needs, Kennametal offers a selection that will provide the right tool for every job . . . for every shop, whether large or small.

Call in your Kennametal Carbide Engineer today to help you get the best tooling for every machine and material... applying Kennametal and helping to solve tough machining problems is his *full-time* job. Or write Kennametal Inc., Latrobe, Pennsylvania.

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KENNAMETAL ... Partners in Progress



Mills Try to Refine 2nd Quarter Orders

Steelmakers are pressing users for final approval and definite shipping dates on April-June tonnages.

The aim: Make sure all the steel is wanted and can be shipped before July.

 Steel mills are trying to tie down customers on their exact second quarter needs.

In most cases it's not a selling job. The steel has already been requested by customers. Now mills must "refine" these orders, getting definite shipping dates from buyers.

Failure to do so will only further muddle second quarter order books. Already difficulties are cropping up. Some large consumers, for instance, are not taking all the tonnage set aside for them. In these cases mill salesmen must scurry around and line up new buyers.

As a result mills are becoming

more insistent that buyers say what they want—and then stick to it. And they are asking customers to observe longer lead times.

Sometimes if buyers don't get orders in far enough in advance producers are cutting back on their allotments. Auto steel buyers, in particular, have been holding up order releases until the last minute.

Fastener Pricing—Fastener price methods are getting a new look under schedules set up by Pittsburgh Screw and Bolt Corp. The new system, replacing list and discount pricing with net pricing, was first discussed last fall. (See The IRON AGE, Oct. 30, 1958, p. 51.)

Effective March 30, it applies to regular square and hexagon head machine bolts, carriage bolts, lag bolts, and low carbon steel bright cap screws.

According to Donn D. Greenshields, president of Pittsburgh Screw and Bolt, the new system "will make the lowest price available without distributors accumulating orders for a variety of lines."

Here's how the new method will operate:

Prices will be quoted according to the quantity of an item ordered. Lowest or extreme price will apply on orders of three or four kegs or cases of an item. Previously the extreme price began at the 40,000 lb level and customers accumulated a variety of items to get it.

Under the new system shipments over 20,000 lb will be delivered with no freight charge. Currently freight charges are figured from point of the nearest manufacturing competitor.

Sheet and Strip—Most mills are restricting orders for April and May. Hot-rolled sheet producers are urging that buyers stick to 45-day lead times. The mills are making every effort to get the most steel out before second quarter ends.

Bar—Automotive sized bars are on allocation with mills at near capacity levels. Demand for larger sized bars (for non-auto use) is picking up.

Wire Products — With orders steadily improving, mills are operating at about 90 pct of capacity. Merchant wire sales have increased in the last few weeks.

Alloy Price Cut—Reduced base prices for a number of vacuum-melted high - temperature, high-strength alloys used in jet aircraft and missiles have been announced by Allegheny Ludlum Steel Corp.

New prices, effective March 19, on forging billets are: Altemp A-286, \$1.60 a lb; Discaloy, \$1.66; Altemp 1251, \$3.57; Waspaloy, \$6.15; and M-252, \$6.15. At the same time, a new schedule of size extras, partially off-setting these reductions, is now in effect.

Price cuts were also made on plates, sheets, and cold-rolled strip of Altemp A-286. New prices: Plates—\$2.73 a lb, and sheet and strip—\$2.85 a lb.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	Quota	Quota	Quota	Quota	Quota	12 wks
HR Carbon Sheet	Quota	Quota	Quota	Quota	Quota	12 wks
CR Carbon Strip	Quota	Quota	Quota	Quota	Quota	12 wks
HR Carbon Strip	Quota	Quota	Quota	Quota	Quota	12 wks
HR Carbon Bars	10-12 Wks	6-8 wks	Quota	Quota	Quota	8-10 wks
CF Carbon Bars	6-8 wks	6-8 wks	2-4 wks	Quota	Quota	5 wks
Heavy Plate	Quota	Quota			Quota	12 wks
Light Plate	5-10 wks	Quota	Quota		Quota	12 wks
Merchant Wire	Stock	Stock	4-8 wks		4-8 wks	4 wks
Oil Country Goods	Quota	Quota	12-16 wks		Quota	
Linepipe	Quota	3 mos	8-12 wks		Quota	8-10 wks
Buttweld Pipe	1-2 wks	Stock	2-4 wks	4-6 wks	8-12 wks	4 wks
Std. Structurals	4-6 wks	5-7 wks		4-12 wks	Quota	4-5 wks
CR Stainless Sheet	6 wks	3-4 wks	6-8 wks	4-8 wks	3	
CR Stainless Strip	8 wks	8-10 wks	6-8 wks	4-8 wks		

COMPARISON OF PRICES

(Effective March 24, 1959)

Price advances over previous declines appear in Italics.	week are	printed	in Heav	y Type;
	Mar. 24	Mar.17	Feb. 24 1959	Mar. 25
Flat-Rolled Steel: (per pound)		1000		
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)		52.00	52.00	52.00
Tin and Terneplate: (per base be	(x)			
Tinplate (1.50 lb.) cokes	\$10.65	\$10.65	\$10.65	\$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	6.675€	5.675¢	5.425
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)	8.00€	8.00€	8.00d	7.65¢
Bright wire	8.00¢	8.00€	8.000	1.000
Rails: (per 100 lb.) Heavy rails	85.75	85.75	\$5.75	\$5,525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
	\$80.00	\$80.00	\$80.00	\$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloy blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pou		0.404	0.404	6.15¢
Wire rods	6.40¢ 5.05	6.40¢	6.40¢ 5.05	4.875
Skelp	5.05	0.00	0.00	4.010

Mar. 24 1959	Mar. 17 1959	Feb. 24 1959	Mar. 25 1958
Pig Iron: (per gross ton)			
Foundry, del'd Phila \$70.57	\$70.57	\$70.57	\$70.97
Foundry, Southern Cin'ti 73.87	73.87	73.87	73.87
Foundry, Birmingham 62.50	62.50	62.50	62.50
Foundry, Chicago 66.50	66.50	66.50	66.50
Basic, del'd Philadelphia 70.07	70.07	70.07	70.47
Basic, Valley furnace 66.00	66.00	66.00	66.00
Malleable, Chicago 66.50	66.50	66.50	66.50
Malleable, Valley 66.50 Ferromanganese, 74-76 pct Mn.	66.50	66.50	66.50
, cents per lb\$ 12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)			
Pig iron \$66.41	\$66.41	\$66.41	\$66.49
Scrap: (per gross ton)			
No. 1 steel, Pittsburgh \$ \\\ \ \ 3.50	844.50	\$46.50	\$34.50
No. 1 steel, Phila. area 37.50	37.50	39.50	38.00
No. 1 steel, Chicago 40.50	40.50	43.50	32.50
No. 1 bundles, Detroit 34.50	37.50	39.50	27.50
Low phos., Youngstown \$5.50	45.50	49.50	35.50
No. 1 mach'y cast, Pittsburgh 50.50	51.50	51.50	\$1.50
No. 1 mach'y cast, Phila 49.50	49.50	49.50**	49.50
No. 1 mach'y cast, Chicago 5 § .50	55.50	57.50	48.50
Steel Scrap Composite: (per gross ton)			
No. 1 hvy. melting scrap \$ \$0.50	40.83	\$43.17	\$35.00
No. 2 bundles 27.83	28.67	30.33	26.17
Coke, Connellsville: (per net ton at ove	en)		
Furnace coke, prompt \$14.50-15.50 \$1			
Foundry coke, prompt 18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to			
Copper, electrolytic, Conn 81.50	31.50	30.00	25.00
Copper, Lake, Conn 31.50	31.50	30.00	25.00
Tin. Straits, N. Y 102.75†		103.75	93.87
Zinc, East St. Louis 11.00	11.00	11.50	10.00
Lead, St. Louis 11.30	11.30	11.30	12.80
Aluminum, virgin ingot 26.80	26.80	26.80	28.10
Nickel, electrolytic 74.00	74.00	74.00	74.00
Magnesium, ingot 36.00	36.00	36.00	36.00
Antimony, Laredo, Tex 29.50	29.50	29.50	29.50
† Tentative. Average. * Revised. ** C	Latanuar		

Finished Steel Composite

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Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Busy Mills Spurn Dealer Scrap

As the second quarter approaches, the mills are getting busier.

But they're turning their backs on scrap offerings. Industrial lists pour in.

■ The gap between scrap prices and the steel operating rate grows perplexingly wider.

The operating rate moved up a point to 93 pct this week while The IRON AGE No. 1 heavy melting Composite Price slipped 33¢ to \$40.50, based on a \$1 drop in Pittsburgh.

It was once an accepted rule-ofthumb that when the steel operating rate passed the 80 pct mark, the mills would come into the market for large tonnages of scrap. And as the mills bought heavily, scrap prices would climb. So goes the theory.

Now the big question in the minds of many scrap men today is "Will it ever be that way again?"

After hitting a low of \$40.50 last Jan. 13, the Composite Price climbed feebly for a few weeks. It peaked at \$43.83 in the middle of February. Since then, it has been slipping steadily.

Apart from the fact that mill scrap inventories are in good shape, auto production is picking up speed, throwing large amounts of industrial scrap into an already-glutted market. Dealer openhearth scrap prices dropped \$3 in Detroit as a result. It's also hurting the Cleveland market.

Now dealers face a bleak second quarter. It's becoming apparent

that the mills may be able to nurse their present scrap inventories through June.

Pittsburgh — Prices of dealer openhearth grades are down \$1 here. The drop reflects growing pressure to sell in a market that is still not generating tonnage orders. Prices of secondary openhearth grades may be passing the cutoff point, even for today's limited requirements. There is no assurance, however, that they may not be pushed still lower.

Chicago — A mild downward drift continued to set the general market tone. Attempts to buy at \$2 under the market were unsuccessful, but minor breaks occurred in a number of grades. Fresh purchases of stainless grades reaffirmed quoted prices, despite the low volume of movement on new orders.

Philadelphia — Prices are unchanged in a slow, weak market. Responsible for the status quo is the continuing policy of one district mill of buying small quantities of openhearth scrap on a week-to-week basis. The business is being spread around to dealers one carload apiece. Moderate export business is helping to keep the bottom from dropping out of this market.

New York—Steelmaking grades fell \$1 a ton in face of consumer disinterest. The trade is frankly puzzled by high operating rates and low scrap movement. Recent Japanese orders for a million tons of scrap is hoped to bring some business to the East. But many fear

that West Coast and Gulf ports will get the lion's share.

Detroit—A sharp drop in scrap prices is expected as dealers and brokers bid on large industrial lists. On top of this, mills show little interest in new purchases. The large industrial offerings leave dealers with the prospect of low sales, if any, in the coming months.

Cleveland—Steelmaking grades settled another \$1 as mill apathy continues. Dealer inventories are piling up. Auto wreckers who have held scrap for over a year are also giving up and trying to unload without much success.

St. Louis—Most scrap prices are unchanged in this area. Dealer inventories remain heavy and offerings far exceed mill orders. Stove plate is strong, and brought \$45.50, up \$1.50.

Birmingham—With exception of cast, practically no scrap is moving in this district. No new buying of openhearth material is expected until the first of April.

Cincinnati—Market is off \$1 on broker offerings but outlook is still better than other areas. Mills will probably take less tonnage next month than previously, and at a lower price.

Buffalo—All strength has gone from the market here. Dealers are pessimistic and forecast a \$2 drop when the next sale is made. Mill inventories are in good shape.

Boston—Very little activity here. Lack of demand has caused a drop in openhearth scrap prices. No. 2 bundles price is nominal.

West Coast — Market in Los Angeles is strong due to export business. San Francisco and Seattle are reported quiet. Mills are staying with orders placed early this month —which weren't too much.

Houston—The market is quiet. Scrap intake has improved with the weather. The cast market is inactive and brokers are expressing disappointment in the Mexican market.



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Availability, quality, and knowhow—all the things you want in motors. Here's why you get all this and more with Century Electric motors:

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CENTURY ELECTRIC COMPANY

Bt. Louis 3, Missouri Offices and Stock Points in Principal Cities



Pittsburgh

No. 1 hvy. melting	\$43.00	to	\$44.00
No. 2 hvy. melting	35.00		36.00
No. 1 dealer bundles	43.00		44.00
No. 1 deatement bundles			50.00
No. 1 factory bundles	49.00		
No. 2 bundles	30.00		31.00
No. 1 busheling	43.00	to	44.00
Machine shop turn	24.00	to	25.00
Shoveling turnings	29.00	to	30.00
Cast iron borings	29.00	to	30.00
Low phos. punch'gs plate.	49.00	to	50.00
Heavy turnings	37.00		38.00
No. 1 RR hvy. melting	46.00		47.00
Scrap rails, random lgth	55.00	to	56.00
Rails 2 ft and under	58.00	to	59.00
RR specialties	51.00	to	52.00
No. 1 machinery cast	50.00	to	51.00
Cupola cast	46.00	to	47.00
Heavy breakable cast	44.00		45.00
Stainless	24.00	LU	30.00
18-8 bundles and solids.			
18-8 turnings	120.00	to	125.00
430 bundles and solids	130.00	to	135.00
410 turnings	55.00	fO	90.00

Chicago

unicago			
No. 1 hvy. melting	40.00	to	\$41.00
No. 2 hvy. melting	35.00	to	36.00
No. 1 dealer bundles	41.00		42.00
No. 1 factory bundles	44.00	to	45.00
No. 2 bundles	28.00	to	29.00
No. 1 busheling	40.00		41.00
Machine shop turn	20.00		21.00
Mixed bor. and turn	22.00	to	23.00
Shoveling turnings	22.00	to	23.00
Cast fron borings	22.00	to	23.00
Low phos. forge crops	50.00	to	51.00
Low phos. punch'gs plate,			
in. and heavier	47.00	to	
Low phos, 2 ft and under.	45.00	to	46.00
No. 1 RR hvy. melting	44.00	to	45.00
Scrap rails, random lgth	50.00		51.00
Rerolling rails	62.00	to	63.00
Rails 2 ft and under	58.00	to	59.00
Angles and splice bars	53.00		54.00
RR steel car axles	70.00	to	71.00
RR couplers and knuckles	49.00		50.00
No. 1 machinery cast	54.00		55.00
Cupola cast	47.00		48.00
Cast iron wheels	41.00		42.00
Malleable	55.00		56.00
Stove plate	44.00	to	45.00
Steel car wheels	49.00	to	50.00
Statulean			
18-8 bundles and solids.			
18-8 turnings			
430 bundles and solids	115.00	to	120.00
430 turnings	55.00	to	60.00

Philadelphia Area

i middelbuid wied		
No. 1 hvy. melting	37.00 to	\$38.00
No. I hvy. melting	32.00 to	33.00
No. 1 dealer bundles	40.00 to	41.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	39.00 to	40.00
Machine shop turn	21.00 to	22.00
Mixed bor, short turn,	22.00 to	23.00
Cast iron borings	22.00 to	23.00
Shoveling turnings	25.00 to	26.00
Clean cast. chem. borings.	30.00 to	31.00
Low phos. 5 ft and under.	43.00 to	44.00
Low phos. 2 ft punch'gs	44.00 to	45.00
Elec. furnace bundles	41.00 to	42.00
Heavy turnings	35.00 to	36.00
RR specialties	45.00 to	46.00
Rails 18 in. and under	59.00 to	60.00
Cupola cast	40.00 to	41.00
Heavy breakable cast	42.00 to	43.00
Cast iron car wheels	44.00 to	45.00
Malleable	67.00 to	
No. 1 machinery cast	49.00 to	50.00

Cincinnati

Brokers buying prices per gro	es ten en car	
No. 1 hvy. melting \$	36.50 to \$37.5	50
No. 2 hvy. melting	31.50 to 32.3	50
No. 1 dealer bundles	36.50 to 37.4	50
No. 2 bundles	23.00 to 24.0	06
Machine shop turn	18.00 to 19.0	06
Shoveling turnings	21.00 to 22.0	06
Cast iron borings	19.00 to 20.0	00
Low phos. 18 in. and under	46.00 to 47.6	06
	49.00 to 50.0	00
Rails, 18 in. and under	56.00 to 57.0	00
No. 1 cupola cast		00
Hvy. breakable cast	40.00 to 41.0	00
Drop broken cast	48.00 to 49.0	06

Youngstown

No. 1 hvy. melting	 		 43.00	to	\$44.00
No. 2 hvy. melting					
No. 1 dealer bundles			43.00	to	44.00
No. 2 bundles	 		27.00	to	28.00
Machine shop turn.					
Shoveling turnings			22.00	to	23,00
Low phos. plate					

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting\$39.50 to \$	40.50
No. 2 hvy. melting 32.50 to	33.50
No. 1 dealer bundles 39.50 to	40.50
No. 1 factory bundles 44.00 to	45.00
No. 2 bundles 23.50 to	24.50
No. 1 busheling 39.50 to	40.50
Machine shop turn 17.00 to	18.00
Mixed bor. and turn 22.00 to	23.00
Shoveling turnings 22.00 to	23.00
	23.00
	20.00
Cut structural & plates, 2	45 00
ft & under 46.00 to	47.00
Drop forge flashings 39.50 to	40.50
Low phos. punch'gs plate. 40.50 to	41.50
Foundry steel, 2 ft & under 40.00 to	41.00
No. 1 RR hvy. melting 44.00 to	45.00
Rails 2 ft and under 58.00 to	59.00
Rails 18 in. and under 59.00 to	60.00
Steel axle turnings 26.00 to	27.00
Railroad cast 53.00 to	54.00
No. 1 machinery cast 51.00 to	52.00
Stove plate 48.00 to	49.00
Malleable 66.00 to	67.00
	01.00
Stainless	200 00
18-8 bundles210.00 to 2	20.00
18-8 turnings	20.00
430 bundles	20.00

Buffalo

No. 1 hvy. melting	39.00	to	\$40.0
No. 2 hvy. melting	32.00	to	33.0
No. 1 busheling	39.00	to	40.0
No. 1 dealer bundles	39.00	to	40.0
No. 2 bundles	28.00	to	29.0
Machine shop turn	18.00	to	19.0
Mixed bor, and turn,	20.00	to	21.0
Shoveling turnings	22.00	to	23.0
Cast iron borings	20.00	to	21.0
Low phos. plate	44.00	to	45.0
Structurals and plate			
2 ft and under	48.00	to	49.0
Scrap rails, random lgth	46.00	to	47.0
Rails 2 ft and under	56.00	to	
No. 1 machinery cast	51.00	to	52.0
No. 1 cupola cast	47.00	to	48.0

St. Louis

No. 1 hvy. melting	36.00	to	\$37.00
No. 2 hvy. melting	34.00	to	35.00
No. 1 dealer bundles	39.00	to	40.00
No. 2 bundles	27.00	to	28.00
Machine shop turn	18.00	to	19.00
Shoveling turnings	20.00	to	21.00
Cast iron borings	22,00	to	23.0€
No. 1 RR hvy. melting	41.00		42.00
Rails, random lengths	47.00	to	48.00
Rails, 18 in, and under	52.00		53.00
Angles and splice bars	49.00	to	50.00
RR specialties	45.00		46.00
Cupola cast	49.00	to	50.00
Heavy breakable cast	40.00	to	41.00
Cast iron brake shoes	37.00	to	38.00
Stove plate	44.50		45.50
Cast iron car wheels	44.00	to	45.00
Rerolling rails	59.00		
Unstripped motor blocks	41.00		

Birmingham

an minginam		
No. 1 hvy. melting	33.00 to	\$34.0
No. 2 hvy. melting	28,00 to	29.0
No. 1 dealer bundles	33.00 to	34.0
No. 2 bundles	21.00 to	22.0
No. 1 busheling	33.00 to	
Machine shop turn	24.00 to	25.0
	25.00 to	26.0
Cast iron borings	14.00 to	
Electric furnace bundles	37.00 to	38.0
	36.00 to	37.0
Bar crops and plate	41.00 to	42.0
Structural and plate, 2 ft.	40.00 to	41.0
No. 1 RR hvy. melting	37.00 to	38.0
Scrap rails, random lgth	43.00 to	44.0
Rails, 18 in. and under	51.00 to	52.0
Angles and splice bars	44.00 to	45.0
Rerolling rails	55.00 to	
No. 1 cupola cast.	53.00 to	
	53.00 to	
Stove plate	40.00 to	
	40.00 to	
Unstripped motor blocks	40.00 C	9 EL.

New York

Brokers buying prices per gross ten or	Cars:
No. 1 hvy. melting\$29.00 to	\$30.00
AT- 0 hours and the name of 00 4-	00.00
No. 2 hvy. melting 26.00 to	
No. 2 dealer bundles 18.00 to	19.00
Machine shop turnings 12.00 to	13.00
Mixed bor. and turn 15.00 to	16.00
Shoveling turnings 16.00 to	17.00
Clean chem. cast. borings. 23.00 to	25.00
No. 1 machinery cast 37.00 to	38.00
Mixed yard cast 35.00 to	36.00
Heavy breakable cast 33.00 to	34.00
	94.00
Stainless	
18-8 prepared solids195.00 to	200.00
18-8 turnings \$5.00 to	90.00
430 prepared solids 85.00 to	90.00
too prepared solids soloo to	00.00
430 turnings 20.00 to	25.00

Detroit

Delivit	
Brokers buying prices per greas ton	on cars:
No. 1 hvy. melting\$32.00	to \$33.00
No. 2 hvy. melting 26.00	to 27.00
No. 1 dealer bundles 34.00	to 35.00
No. 2 bundles 21.00	to 22.00
No. 1 busheling 32.00	
Drop forge flashings 31.00	
Machine shop turn 13.00	
Mixed bor. and turn 15.00	
Shoveling turnings 16.00	
Cast iron borings 15.00	
Heavy breakable cast 34.00	
Mixed cupola cast 41.00	
Automotive cast 48.00	to 49.00
Stainless	
18-8 bundles and solids. 210.00	to 215.00

18-8 bundles and solids. 210.00 to 215.00 18-8 turnings 100.00 to 105.00 430 bundles and solids. 105.00 to 110.00

Boston

Brokers buying prices per gre	ses ten on cars:
No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	27.00 to 28.00
Machine shop turn	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Clean cast. chem. borings.	18.00 to 19.00
No. 1 machinery cast	33.00 to 34.00
Mixed cupola cast	33.00 to 34.00
Heavy breakable cast	31.00 to 32.00
Stove plate	

San Francisco

No. 1 hvy. melting \$3	6.00
	4.00
No. 1 dealer bundles\$32.00 to 3	4.00
	2.00
Machine shop turn 1	7.00
Cast iron borings 1	7.00
No. 1 cupola cast 44.00 to 4	5.00

Los Angeles

No. 1 hvy. melting \$38.00
No. 2 hvy. melting 36.00
No. 1 dealer bundles 35.00
No. 2 bundles 21.00
Machine shop turn\$16.00 to 17.00
Shoveling turnings 18.00 to 19.00
Cast iron borings 18.00 to 19.00
Elec. furn. 1 ft and under
(foundry) 49.00
No. 1 cupola cast 45.00 to 46.00

No. 1 hvy. melting No. 2 hvy. melting No. 2 bundles No. 1 cupola cast. Mixed yard cast.

Seattle

Hamilton, Ont.		
Brokers buying prices per gre	as ton	on cars:
No. 1 hvy. melting		\$34.50
No. 2 hvy. melting		30.50
No. 1 dealer bundles		
No. 2 bundles		25.00
		26.50
Bush., new fact., prep'd		34.50
Bush., new fact., unprep'd		18.50
Machine shop turn		13.00
Short steel turn.		17.00
Mixed bor, and turn		13.00
Rails, rerolling		37.00
Cast scrap	46.50	

Houston

Brokers	buyi	ng	prie	100	1	pe	H		Ħ	T	08		t	61	1 6	n	CAPS
No. 1 1	hvy.	me	ltin	g				a		9	,						18.00
No. 2 1	hvy.	me	ltin	8		0	0	0	0	0				. 0			3.00
No. 2	bund	les							0	9							13.00
Machin																	16.00
Shoveli														9 0		- 7	20.00
Cut str	ructu	ral	pla	Lte	1						_						
2 ft	& ui	ade	r								3	ı		00	to		18.00
Unstrip	pped	mo	otor	b	k	X	d	CH	в.		- 3	!!	١.	00	to		39.00
Cupola	cast			0 0 0	0 1						4	H	١.	U (to	1	16.00
Heavy	bres	ika.	ble	CB	LIB	ŧ.					- 1	31	١.,	0 () to	1	11.00

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what's the Mews?

In 1084 B. C. the fall of Troy was announced to the people of Greece by light signals. During later centuries mass communication depended upon such media as smoke, mirrors, town criers, jungle drums.

About 1440, Gutenberg started printing from his movable type; but it was 1609 before a regular newspaper appeared in Germany and not until 1704 that the Boston News Letter became the earliest newspaper published in America.

From East Pittsburgh, Pennsylvania, the initial scheduled radio broadcast was transmitted in 1920; from Berlin, the 1936 Olympics became the first televised event of world wide importance.

For today's dissemination of news—presses for 10,755 newspapers and 3332 magazines; towers, masts and equipment for 3073 radio and 479 TV stations—the fabrication of steel in millions of tons is a prerequisite—and scrap must be available to the country's mills in never-failing supply.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"



231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Will Copper Labor Really Be Tough?

At a recent meeting the big copper union indicated it will be after practically everything this summer.

The trade says some of this is just talk. But how much?

• The International Union of Mine, Mill and Smelter Workers met in San Francisco last week, and talked pretty tough. But then unions usually do just before negotiations.

Mine, Mill contracts with major copper companies expire June 30. Some talks will start in a few days; all will be underway before April is very old.

Mostly Talk—The trade is discounting much of the initial blast of the union's leaders as largely bluster. Its value is mostly as a starting point, with which to compare future statements and actions in seeking the trend.

The possibility of strikes hasn't really been clarified much.

There isn't much the union leaders left off the informal listing of their program. They want better cost-of-living increases. They figure they've taken a 15¢-to-18¢ licking compared to other industries on this over the last three years.

They want a shorter work week; more fringe benefits like higher severance pay, more SUB, more sick leave, holidays and vacation. And they want shorter contracts, or the right to reopen the key clauses yearly.

Money Counts — But feeling among closest observers is that straight wage hikes will be the real

issue. It may be that Mine, Mill will make its pitch on the improved productivity per worker.

Union representatives say that on the average, two men are now doing the work that seven did before the recession hit the copper industry. They want some compensation for this.

You are not likely to see any official counterclaims from copper management. One company, which will tangle with Mine, Mill, says it isn't going to fight this battle in the press. Others will likely agree.

One copper spokesman calls the union ratio "cockeyed." He says, "We've made some improvement in worker productivity, sure, but nothing like that.

"But," he goes on, "If I were the press agent for the union I'd probably be doing the same thing."

Other Factors—Here's something that may keep the union on the "tough" road: Membership is down about 20 pct in the last few years. And the union figures average hourly earning in the copper industry (Mine, Mill is the major union) at \$2.42, compared to \$2.87 in steel, and \$2.53 in autos.

The union believes the drop in membership is probably due to the combination of recession layoffs and per-worker output improvements. But a fat new contract would remove future doubts.

Several other big question marks: Some in the trade say the union doesn't have the money to support a lengthy strike.

And one observer insists, "From what I hear from out west, the rankand-file don't want to strike."

Copper

The market quieted down somewhat this week. Custom smelters reported slackened demand for 34¢ copper. And some dealers were selling for even less.

At first glance this was puzzling. Fabricator business is better than ever. And there is no real change in the strike outlook.

The price on the New York Commodity Exchange plummeted by as much as 167 points. This appeared to knock many buyers off the merrygo-round, at least temporarily, for a long second look.

Insiders say several major scrap buyers deliberately took some Comex losses to push the market down. Why? Scrap dealers were so sure that the market was about to skyrocket, they were all holding back their metal for the higher prices. Scrap supplies had all but dried up.

Whether these observers are right or wrong, scrap supplies are definitely easier this week.

Also helping settle the market: London is off enough to send some metal in our direction.

Tin prices for the week: March 18—103.375; March 19—103.375; March 20—103.00; March 23—102.75; March 24—102.75.*

Primary Prices

24.00	0/2/50
	8/1/58
26.10	8/1/58
30.00	3/9/80
32.00	3/16/59
30.00	3/9/59
10.80	3/5/80
11.00	3/5/60
34.00	8/13/56
33.75	8/13/56
84.50	12/8/88
85-205	11/3/88
11.50	2/25/89
12.00	2/25/59
	28.10 30.00 32.00 39.00 10.80 11.00 34.00 33.75 94.50 85-208 11.50

ALUMINUM: 99% Ingot frt allwd. COP-PER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. Tin: See above; Other primary prices, pg. 196.



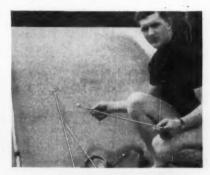
Photograph by famous underwater hunter-photographer Jim Thorne

DEEP SEA HUNTER FAILS TO FLAKE INLAND TI-CO®

More than a match for ferocious 700-pound hammerhead sharks, this compressed-air powered gun fires underwater spears with terrific force. Again and again: its high-speed missiles pierced this Inland TI-CO galvanized sheet, yet at the edges around the holes there wasn't a trace of flaking of the zinc coating.

Yes, you can perforate TI-CO sheets. You can subject them to deep-drawing, spin-drawing, punching, crimping, Pittsburgh lock-seaming, in fact the toughest fabricating processes—but you won't flake TI-CO!

No wonder TI-CO galvanized sheets are top-choice with manufacturers in such a wide variety of new applications and products. TI-CO is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in gages 8 to 30 inclusive and in widths as great as 60 inches. Specifications, application and performance data, complete information, is all contained in a free TI-CO booklet we'll be glad to send at your request. For your galvanized sheet or coils requirements, consult your Inland representative.



Close-up inspection shows no flaking of TI-CO's zinc coating



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959

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed) Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alioy	.032	.081	.136	3.250-
1100, 3003	45.7	43.8	42.8	43.3
	53.1	48.4	46.9	46.0
	50.1	45.7	43.9	44.9

Extruded Solid Shapes

	Factor	6063 T-5	6062 T-6
			51.1-54.8
			52.0-56.5
			62.8-67.5
36-38		46.7-49.2	86.9-90.5

Screw Machine Stock-2011-T-3

Size"	34	36-36	34-1	134-134
Price	62.0	61.2	59.7	57.3

Roofing	Sheet,	Co	rrugat	bed		
(Per	sheet.	26"	wide	base.	16.000	1b)

Length"→	72	96	120	144
.019 gage	\$1.411	\$1.884	\$2.353	\$2.823
	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed) Sheet and Plate

Type→ Gage→	.250 3.00	250-	.188	.081	.032
AZ31B Stand, Grade		67.9	69.0	77.9	108.1
AZ31B Spec		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0	*****			

Extruded Shapes

factor->	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	60.6	70.7	75.6	80.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

APPARTS	ATOL CLASSICAL	97.05	(delimoned)
AZULB	(Die Casting)		(delivered)
A IRAM A	A 700 A A 701	(Sand Casting) 40 78	(Volumes Tax

NICKEL, MONEL, INCONEL

(Rase prices f.o.b. mill)

,	"A	" Nickel	Monel	Incone
Sheet, CR		126	106	128
Strip, CR			108	138
Rod, bar, HR			89	109
Angles, HR .			89	109
Plates, HR .			105	121
Seamless tube			129	200
Shot, blocks			87	

COPPER, BRASS, BRONZE (Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63		52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.65
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80		46.61	56.21
Munts Metal	50.85		46.16	
Comm. Bs.	53.90	54.44	53.84	56.96
Mang. Bz	56.54		50.14	
Phos. Bs. 5%	75.34		75.84	

TITANIUM

(Base prices, f.o.b. mill)

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, \$6.90\$7.40; alloy, \$14.35, Plate, HR, commercially pure, \$5.00-\$5.75; alloy, \$7.75-\$8.50. Wire, rolled and/or drawn, commercially pure, \$5.50\$6.00; alloy, \$8.00-\$9.50; Bar. HR or forged, commercially pure, \$4.25\$7.15; billets, HR, commercially pure, \$4.25\$7.16; billets, HR, commercially pure, \$3.55\$4.10; alloy, \$3.55-\$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex 29.50
Beryllium aluminum 5% Be, Dollar
per lb contained Be\$74.75
D
Beryllium copper, per lb conta'd Be.\$43.00
Beryllium 97% lump or beads.
f.o.b. Cleveland, Reading\$71.50 Bismuth, ton lots \$ 2.25
Bismuth, ton lots
Codmium del'd
Cadmium, del'd 1.45
Calcium, 99.9% small lots 4.55
Chromium, 99.8% metallic basis\$ 1.31
Cobalt, 97-99% (per lb)\$1.75 to \$1.82
Contre, 01-5076 (per 10) \$1.15 to \$1.82
Germanium, per gm, f.o.b. Miami,
Okla refined 35.00 to 49.00

REMELTED METALS

Brass Ingot

(Cents	ner	-	d	_	-	- 4	,	-			-	7.			3.	
85-5-5 ingot	per		u	0.0		10	, ,	54	,	u	3 1	P	,,	84	40	,
20 440													·			32.25
No. 120																31.00
No. 123																30.00
80-10-10 in																
No. 305 .																36.50
No. 315																34.50
88-10-2 ing	ot															
No. 210				٠												45.50
																41.25
No. 245																37.00
Yellow ingo	t															
No. 405							٠									26.50
Manganese																
No. 421 .							0									29.75

(Cents per to acra so, ovo to ana over)
95-5 aluminum-silicon alloys
0.30 copper max24.75-25.00
0.60 copper max24.50-24.75
Piston alloys (No. 122 type) 24.25-25.25
No. 12 alum. (No. 2 grade) 21.50-22.00
108 alloy
195 alloy
13 alloy (0.60 copper max.)24.25-24.75
A V.C. 679 (1 pot gipe) 91 75 99 95

(Effective March 23, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

	3	 -	_	-					•		
											.22.50-23.50
											.21.25-22.25
											. 20.25-21.25
Grade	4-85-90%				0	0	0	0	0	0	.17.50-18.50

SCRAP METALS

Brass Mill Scrap

shipments of 20,000 lb and	
	Turnings
Copper 27 1/2	26 3/4
Yellow brass 20 %	18%
Red brass 241/4	23 1/2
Comm. bronze 25 1/4	24%
Mang. bronze 191/4	18%
Free cutting rod ends. 20 1/2	

Customs Smelters Scrap

(Cents per		carlo	lots,	
No. 1 coppe	er wire		 	2834
No. 2 coppe	r wire		 	271/4
Light coppe	Γ		 	25
*Refinery b	rass .		 	26 34
Copper bear	ring ma	aterial	 	25 %
*Dry cop	per con	ntent.		

EAST

Ingot Makers Scrap delivered

to refinery)	escare or ou
No. 1 copper wire	2834
No. 2 copper wire	27 1/4
Light copper	25
No. 1 composition	221/4
No. 1 comp turnings	221/4
Hvy. yellow brass solids	17
Brass pipe	171/2
Radiators	17%

		- 2	41	86	191	n	į1	21	161	m	į.					
Mixed															-13	
Mixed															-14	
Mixed	turn	ııngs,	u	8	y		0	0	0	0	0	0	0	10	-14	

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	26 26 1/2
No. 2 copper wire	24 -24 1/2
Light copper	22 -221/2
Auto radiators (unsweated).	16 -16 1/2
No. 1 composition	201/2-21
No. 1 composition turnings	19 1/2 20
Cocks and faucets	$16\frac{3}{4} - 17$
Clean heavy yellow brass	141/2-15
Brass pipe	1634-17
New soft brass clippings	17 -17 1/2
No. 1 brass rod turnings	14%-15

Aluminum

Alum. pistons and st Aluminum crankcas													
1100 (2s) aluminum Old sheet and utens	C	1	ly	ď	ì	n	g	8	13	3	_	13	1/2
Borings and turning Industrial castings	8		0						- (6	_	6	3/2
2020 (24S) clipping	В		0	0			0						
New zinc clippings	ne								4	1 %		5	1/4

Nickel and Monel	
Pure nickel clippings	52-54
Clean nickel turnings	37-46
Nickel anodes	52-5
Nickel rod ends	52-5
New Monel clippings	30-33
	30-33
Old sheet Monel	26-28
Nickel Silver clippings, mixed	18
Nickel silver turnings, mixed	15

Soft scrap lead	61/2- 63/4
Battery plates (dry)	2 - 2%
Batteries, acid free	1%-2
Miscellaneous	

Block tin 77 -78	
No. 1 pewter 59 -60	
Auto babbitt 40 -41	
Mixer common babbitt 91/2-10	
Solder joints 13 1/4 13	9
Siphon tops 42	
Small foundry type 91/2-10	
Monotype 9 1/2 10	
Lino. and stereotype 8½-9	
Electrotype 7 — 7	
Hand picked type shells 5 1/4 5	
Lino, and stereo, dross 24-2	9
Electro dross 24-2	3

	STEEL	BILLE	TS, BLC SLABS	ooms,	PIL- ING	STI	SHAPES RUCTUR				STR	IP		
F	PRICES	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
	Bethlehem, Pa.			\$119.00 B3		5,55 B3	8.10 B3	5.55 B5						
	Buffalo, N. Y.	\$80.00 R3,	\$99.50 R3,	\$119.00 R3, B3	6.50 B3	5.55 B3	8.10 B3	5.55 B3	5.10 B3, R3	7.425 S10, R7	7.575 B3			
	Phila., Pa.						-			7.875 P15				
	Harrison, N. J.					-								15.55 CI
ĺ	Conshohocken, Pa.		\$104.50 A2	\$126.00 AZ					5.15 A2		7.575 A2			
	New Bedford, Mass.									7.875 R6				
	Johnstown, Pa.	\$80.00 B3	\$99.50 B3	\$119.00 B3		5.55 B3	8.10 B3							
EAST	Boston, Mass.									7.975 T8				
	New Haven, Conn.									7.875 DI				
	Baltimore, Md.									7.425 T8				15.90 T8
	Phoenixville, Pa.					5.55 P2		5.55 P2						
	Sparrows Pt., Md.								5.10 B3		7.575 B3			
	New Britain, Bridgeport, Wallingford, Conn.			\$119.00 N8				1		7.875 W1,S7				
	Pawtucket, R. I. Worcester, Mass.									7.975 N7, A5				15.90 N7 15.70 T8
_	Alton, Ill.								5.30 L1					
	Ashland, Ky.								5.10 A7		7.575 A7			
	Canton-Massillon, Dover, Ohio		\$102.00 R3	\$119.00 R3, \$114.00 T5						7.425 G4		10.80 G4		
	Chicago, Franklin Park, Evanston, III.	\$80.00 UI, R3	\$99.50 UI, R3,W8	\$119.00 U1, R3,W8	6.50 UI	5.5e UI, W8,P13	8.05 UI. YI,W8	5.50 U!	5.10 W8, N4,AI	7.525 <i>A1</i> , <i>T8</i> , <i>M8</i>	7.575 W8		8.40 W8, S9,13	15.55 AI S9,G4, T
	Cleveland, Ohio									7.425 A5, J3		10.75 A5	8.40 J3	
	Detroit, Mich.			\$119.00 R5					5.10 G3, M2	7.425 M2, S1, D1,P11	7.575 G3	10.80 SI		
_	Anderson, Ind.									7.425 G4				
E WEST	Gary, Ind. Harbor, Indiana	\$80.00 UI	\$99.50 UI	\$119.00 UI, YI		5.50 UI, 13	8.05 UI, J3	5.50 13	5.10 UI, I3, YI	7.425 YI	7.575 UI, 13, YI	18.90 Y/	8.40 UI, YI	
MIDDLE	Sterling, III.	\$80.00 N4				5.50 N4	7.75 N4	5.50 N4	5.20 N4					
M	Indianapolis, Ind.									7.575 R5				15.70 R5
	Newport, Ky.								5.10 //9				8.40 /19	
	Niles, Warren, Ohio Sharon, Pa.		\$99.50 SI, C10	\$119.00 C10,S1					5.10 R3, SI	7.425 R3, T4,S1	7.575 R3, SI	10.80 R3, S/	8.40 SI	15.55 S/
1	Owensbore, Ky.	\$80.00 G5	\$99.50 G5	\$119.00 G5										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	\$80.00 U1, P6	\$99.50 UI, CII,P6	\$119.00 U1, C11,B7	6.50 UI	5.50 UI, J3	8.05 U1, J3	5.50 UI	5.10 P6	7.425 <i>J3,B4</i> 7.525 <i>E3</i>			8.40 S9	15.55 <i>S</i> 9
	Weirton, Wheeling, Follansbee, W. Va.				6.50 UI, W3	5.50 W3		5.50 W3	5.10 W3	7.425 F3	7.575 W3	10.80 W3		
	Youngstown, Ohio	\$80.00 R3	\$99.50 Y1, C10	\$119.00 Y/			8.05 YI		5.10 U	7.425 Y1,R5	7.575 UI,	10.95 Y/	8.40 U1, Y1	15.55 R5, Y1
-	Fontana, Cal.	\$90.50 K1	\$109.00 K/	\$140.00 K1		6.30 K/	8.85 K1	6.45 K1	5.825 K1	9.20 KI				
	Geneva, Utah		\$99.50 C7			5.50 C7	8.05 C7							
	Kansas City, Mo.					5.60 S2	8.15 S2						8.65 S2	
	Los Angeles, Torrance, Cal.		\$109.00 B2	\$139.00 B2		6.20 C7,	8.75 B2		5.85 C7,	9.30 C1,R5			9.60 B2	17.75 J3
WEST	Minnegua, Colo.					B2 5.80 C6			6.20 C6	9.375 C6				
*	Portland, Ore.					6.25 O2		-	6.29 CB	3.313 CB				
	San Francisco, Niles,		\$109.00 B2			6.15 B2	8.70 B2		5.85 C7,					
	Pittsburg, Cal.								B2					
_	Seattle, Wash.		\$113.00 B2			6.25 B2	8.80 B2		6.10 B2					
200ТН	Atlanta, Ga. Fairfield, Ala. City, Birmingham, Ala.	\$80.00 72	199.50 T2			5.70 A8 5.50 T2 R3,C16	8.05 T2		5.10 A8 5.10 T2, R3,C/6		7.575 T2			
5	Houston, Lone Star,		2104 50 50	\$124.00 S2		5.60 S2	8.15 S2	-	K3,C10				8.65 S2	

PRICES					SHE	ETS				WIRE ROD	TINP	LATE†	
1	PRICES	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized (Hot-dipped)	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
	Buffalo, N. Y.	5.10 B3	6.275 B3				7.525 B3	9.275 B3		6.40 W6	† Special cor deduct 35¢ i coke base be	ited mfg. terms rom 1.25-lb.	
	Clayment, Del.										lb./0.25 lb. a	dd 55é.	
	Coatesville, Pa.										BLACKPLA	TE 55 to 128	
	Conshohocken, Pa.	5.15 A2	6.325 A2				7.575 A2				1.25 lb. coke * COKES	base box.	
	Harrisburg, Pa.										add 25é.	: 0.50-lb. add	
_	Hartford, Conn.										25é: 0.75-lb.	add 65¢; 1.00- Differential	
EAST	Johnstown, Pa.									6.40 B3	1.00 lb./0.25	lb. add 65¢.	
_	Fairless, Pa.	5.15 UI	6.325 UI				7.575 UI	9.325 UI			\$10.50 UI	\$9.20 UI	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	F 10 D2	C 495 D2	e 095 D2			a rac Di		40 00E D3	4 FO D3	#10 to B2	00 to 82	
		5.10 B3	6.275 B3	6.875 B3			7.525 B3	9.275 B3	10.025 B3	6.50 B3	\$10.40 B3	\$9.10 B3	
	Worcester, Mass.									6.70 A5			
_	Trenton, N. J.												
	Alton, Ill.									6.60 L1			
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7		7.525 A7						
	Canton-Massillon, Dover, Ohio			6.875 R1, R3									
	Chicago, Joliet, Ill.	5.10 W8, Al					7.525 UI, W8			6.40 A5, R3,W8			
	Sterling, Ill.									6.50 N4. K2			
	Cleveland, Ohio	5.10 R3, J3	6.275 R3, J3	7.65 R3*	6.775 R3		7.525 R3, J3	9.275 R3, J3		6.40 A5			
	Detroit, Mich.	5.10 G3, M2	6.275 G3, M2				7.525 G3	9.275 G3					
	Newport, Ky.	5.10 Al	6.275 Al										
WEST	Gary, Ind. Harbor, Indiana	5.10 UI. 13, YI	6.275 UI, I3, YI	6.875 UI,	6.775 UI. 13, YI	7.225 UI	7.525 UI, YI,I3	9.275 UI. YI		6.40 Y/	\$10.40 UI, YI	\$9.10 /3, UI, YI	7.85 UI, YI
LE	Granite City, Ill.	5.20 G2	6.375 G2	6.975 G2	6.875 G2							\$9.20 G2	7.95 G2
MIDDLE	Kokomo, Ind.			6.975 C9					-	6.50 C9			
Σ	Mansfield, Ohio	5.10 E2	6.275 E2			7.225 E2							
	Middletown, Ohio		6.275 A7	6.875 A7	6.775 A7	7.225 A7							
	Niles, Warren, Ohio Sharon, Pa.	5.10 R3, SI	6.275 R3	6.875 R3 7.65 R3*	6.775 SI	7.225 SI*,	7.525 R3, S1	9.275 R3,				\$9.10 R3	
	Pittsburgh, Midland, Butler, Dances, Aliquippa, McKeesport, Pa.	5.10 U1, J3,P6	6.275 U1. J3,P6	6.875 UI, J3 7.50 E3*	6.775 UI		7.525 UI, J3	9.275 UI, J3	10.025 UI, J3	6.40 A5, J3,P6	\$10.40 W5, J3	\$9.10 UI, J3	7.85 UI, J3
	Portsmouth, Ohio	5.10 P7	6.275 P7							6.40 P7			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 W3, W5	6.275 W3, F3,W5	6.875 W3, W5 7.50 W3°		7.225 W3, W5	7.525 W3	9.275 W3			\$10.40 W5, W3	\$9.10 W5, W3	7.8\$ W5
	Youngstown, Ohio	5.10 UI, YI	6.275 Y/	7.50 J3*	6.775 YI		7.525 Y/	9.275 YI		6.40 Y/			
	Fontana, Cal.	5.825 K1	7.40 KI				8.25 K/	10.40 KI	-		\$11.05 K1	\$9.75 K1	
	Geneva, Utah	5.20 C7											
-	Kansas City, Mo.									6.65 S2			
WEST	Les Angeles, Torrance, Cal.									7.20 B2			
	Minnequa, Colo.									6.65 C6			
	San Francisco, Niles, Pittaburg, Cal.	5.80 C7	7.225 C7	7.625 C7						7.20 C7	\$11.05 C7	\$9.75 C7	
=	Atlanta, Ga.												
SOUTH	Fairfield, Ala. Alabama City, Ala.	5.10 T2, R3	6.275 T2, R3	6.875 T2, R3	6.775 T2					6.40 T2,R3	\$10.50 T2	\$9.20 T2	
	11 . **		1						1	N			

Italies identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

6.65.52

	STEEL							T				
		(BA	RS				PLA'	TES		WIRE
P	RICES	Carbon† Steel	Reinforc-	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
	Bethlehem, Pa.				6.725 B3	9.025 B3	8.30 B3					
	Buffalo, N. Y.	\$.67\$ R3,B3	5.675 R3, B3	7.70 B5	6.725 B3,R3	9.025 B3,B5	8.30 B3	5.30 B3				8.00 W6
	Claymont, Del.							5.30 C4		7.50 C4	7.95 C4	
	Coatesville, Pa.							5.30 L4		7.50 L4	7.95 L4	
	Conshohocken, Pa.							5.30 /12	6.375 A2	7.50 A2	7.95 A2	
	Harrisburg, Pa.							5.30 P2	6.475 P2			
	Milton, Pa.	5.825 M7	5.825 M7									
	Hartford, Conn.			8.15 R3		9.325 R3						
ST	Johnstown, Pa.	5.675 B3	5.675 B3		6.725 B3		8.30 B3	5.30 B3		7.50 B3	7.95 B3	8.00 B3
EAST	Fairless, Pa.	5.825 UI	5.825 UI		6.875 UI							
	Newark, Camden, N. J.			8.10 W10, P10		9.20 W10, P10						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 W10 8.15 J3	6.80 N8	9.175 N8						
1	Sparrows Pt., Md.		5.675 B3	21037				5.30 B3		7.50 B3	7.95 B3	8.10 B3
-	Palmer, Worcester,			8.20 B5,		9.325 A5, B5						8.30 A5,
	Roadville, Mansfield, Mass.			C14		10,00						W6
-	Spring City, Pa.			8.10 K4		9.20 K4						
-	Alton, III.	5.875 <i>L1</i>		0.10107								8.20 L/
-	Ashland, Newport, Ky.	5.010 21						5.30 47, 49		7.50 //9	7.95 A7	
1	Canton, Massillon,	6.15° R3		7.65 R3,R2	6.725 R3	9.025 R3,R2		5.30 E2			-	
	Mansfield, Ohio Chicago, Joliet.	5.675 U1, R3,	5.675 U1, R3,	7.65 A5.	6.475 T5 6.725 U1,R3,	9.025 A5,	8.30 UI,W8,	5.30 UI, AI,	6.375 UI	7.50 UI,	7.95 UI,	8.00 A5, F
	Waukegan, Madison, Harvey, III.	W8,N4,P13	N4,P13,W8 5.875L1	W10,W8, B5,L2,N9	W8	W10,W8, L2,N8,B5	R3	W8,13	4 9 9 12	W8	W8	W8,N4, K2,W7
	Cleveland, Elyria, Obio	5.675 R3	5.675 R3	7.65 A5,C13, C18	A PAR DE CI	9.825 A5. C13,C18	8.30 R3	5.30 R3, J3	6.375 /3	7 50 (2	7.95 R3, J3	8.00 A5, C13,C18
	Detroit, Mich.	5.675 G3	5.675 G3	7.90 P3 7.85 P8,B5 7.65 R5	6.725 R5,G3	9.025 R5 9.225 B5, P3, P8	8.30 G3	5.30 G3		7.50 G3	7.95 G3	
	Duluth, Minn.											8.00 A5
WEST	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 U1,13, Y1	5 675 U1,13, Y1	7.65 R3.J3	6.725 U1,13, Y1	9.025 R3,M4	8.30 UI, YI	5.30 U1,13, Y1	6.375 <i>J</i> 3,	7.50 UI, YI	7.95 UI, YI, I3	8.10 M4
OLE	Granite City, III.							5.40 G2				
MIDDLE	Kokomo, Ind.		5.775 C9						1			8.10 C9
	Sterling, III.	5.775 N4	5.775 N4					5.30 N4				8.10 K2
	Niles, Warren, Ohio			7.65 C10	6.725 C/0,	9.025 C/O		5.30 R3,S1		7.50 SI	7.95 R3,	
1	Sharon, Pa.				4 204 66						SI	
	Owensboro, Ky.	5.675 G5			6.725 G5							
	Pittsburgh, Midland, Donera, Aliquippa, Pa.	5.675 UI, J3	5.675 U1, J3	7.65 A5,B4,* R3,J3,C11, W10,S9,C8, M9	6.725 U1, J3, C11, B7	9.025 A5, W10,R3,S9, C11,C8,M9	8.30 U1,J3	5.30 U1, J3	6.375 U1, J3	7.50 U1, J3,B7	7.95 U1, J3,B7	8.00 A5, J3,P6
1	Portsmouth, Ohio							-				8.00 P7
							-	5.30 W5	-			
	Weirton, Wheeling, Follansbee, W. Va. Youngstown, Ohio	5.675 U1, R3,	5.675 U1, R3,	7.65 AI, YI,	6.725 UI, YI	9.025 Y1,F2	8.30 UI, YI		-	7.50 YI	7.95 UI, YI	8.00 YI
-	Emeryville, Fontana, Cal.	6.425 <i>J</i> 5 6.375 <i>K</i> 1	6.425 /5 6.375 K/	F2	7.775 KI		9.00 K1	5.30 UI, R3, YI 6.10 KI		8.30 K1	8.75 <i>K1</i>	
1		6.375 K/	6.375 K/					E 20 C2			705 67	
	Geneva, Utah	FASE CO	E 095 52		6 875 53		8.55 S2	5.30 C7			7.95 C7	8.25 S2
	Kansas City, Mo. Los Angeles, Torrance, Cal.	5.925 S2 6.375 C7,B2	5.925 S2 6.375 C7,B2	9.10 R3,P14, S12	6.975 S2 7.775 B2	11.00 P14, S12	8.625 B2					8.95 B2
WEST		6.125 C6	6.125 C6	314		312		6.15 C6				8.25 C6
	Minnequa, Colo.	6.125 C8 6.425 <i>O2</i>	6.125 C6 6.425 <i>02</i>					6.15 C8			-	8.43 CD
	Portland, Ore. San Francisco, Niles, Pittsburg, Cal.	6.375 C7 6.425 B2	6.375 C7 6.425 B2				8.675 B2					8.95 C7,C
	Seattle, Wash.	6.425 B2,N6	6.425 B2				8.675 B2	6.20 B2		8.40 B2	8.85 B2	
-	Atlanta, Ga.	5.875 A8	5.675 A8				0.013 BI	0.10 D1		5.40 B1	2.00 01	8.00 //8
Волтн	Fairfield City, Ala. Birmingham, Ala.	5.675 T2,R3, C16	5.675 T2,R3, C16	8.25 C/6			8.30 T2	5.30 T2,R3			7.95 T2	8.00 T2, R
So	Houston, Ft. Worth, Lone Star, Texas	5.925 S2	5.925 S2		6.975 52		8.55 S2	5.40 S2		7.60 S2	8.85 S2	8.25 S2

STEEL PRICES

Key to Steel Producers

With Principal Offices

- Al Acme Steel Co., Chicago
- A2 Alan Wood Steel Co., Conshohocken, Pa.
- A3 Allegheny Ludlum Steel Corp., Pittsburgh
- 14 American Cladmetals Co., Carnegie, Pa.
- American Steel & Wire Div., Cleveland
- A6 Angel Nail & Chaplet Co., Cleveland
- A7 Armco Steel Corp., Middletown, Ohio
 A8 Atlantic Steel Co., Atlanta, Ca.
- A9 Acme-Newport Steel Co., Newport, Ky.
- BI Babcock & Wilcox Tube Div., Beaver Falls, Pe.
- B2 Bethlehem Pacific Coast Steel Corp., San Francisco
- B3 Bethlehem Steel Co., Bethlehem, Pa.
- B4 Blair Strip Steel Co., New Castle, Pa.
- B5 Bliss & Laughlin, Inc., Harvey, Ill.
- Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
- B7 A. M. Byers, Pittsburgh
- B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
- Cl Calatrip Steel Corp., Los Angeles
- C? Carpenter Steel Co., Reading, Pa.
- C4 Claymont Products Dept., Claymont, Del.
- C6 Colorado Fuel & Iron Corp., Denver
- C7 Columbia Geneva Steel Div., San Francisco
- C8 Columbia Steel & Shafting Co., Pittsburgh
- C9 Continental Steel Corp., Kokomo, Ind.
- C10 Copperweld Steel Co., Pittsburgh, Pa.
- C11 Crucible Steel Co. of America, Pittsburgh
- C13 Cuyahoga Steel & Wire Co., Cleveland
- C14 Compressed Steel Shafting Co., Readville, Mass.
- C15 G. O. Carlson, Inc., Thorndale, Pa.
- C16 Connors Steel Div., Birmingham
- C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
- DI Detroit Steel Corp., Detroit
- D2 Driver, Wilbur B., Co., Newark, N. J.
- D3 Driver Harris Co., Harrison, N. J.
- D4 Dickson Weatherproof Nail Co., Evanston, Ill.
- Eastern Stainless Steel Corp., Baltimore
- E? Empire-Reeves Steel Corp., Mansfield, O.
- E3 Enamel Products & Plating Co., McKeesport, Pa.
- Firth Sterling, Inc., McKeesport, Pa.
- Fitzsimons Steel Corp., Youngstown
- F3 Follansbee Steel Corp., Follansbee, W. Va.

- G? Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
- G# Greer Steel Co., Dover, O. G5 Green River Steel Corp., Owenboro, Ky.
- HI Hanna Furnace Corp., Detroit
- 12 Ingersoll Steel Div., Chicago
- 13 Inland Steel Co., Chicago
- 14 Interlake Iron Corp., Cleveland
- J1 Jackson Iron & Steel Co., Jackson, O.
- 12 Jessop Steel Corp., Washington, Pa.
- Jones & Laughlin Steel Corp., Pittsburgh
- Joslyn Mfg. & Supply Co., Chicago J5 Judson Steel Corp., Emeryville, Calif.
- KI Kaiser Steel Corp., Fontana, Calif.
- K2 Keystone Steel & Wire Co., Peoria
- K3 Koppers Co., Granite City, Ill.
- K4 Keystone Drawn Steel Co., Spring City, Pa.
- L1 Laclede Steel Co., St. Louis
- L2 La Salle Steel Co., Chicago
- L3 Lone Star Steel Co., Dallas L4 Lukens Steel Co., Coatesville, Pa.
- MI Mahoning Valley Steel Co., Niles, O. M2 McLouth Steel Corp., Detroit
- M3 Mercer Tube & Míg. Co., Sharon, Pa.
- M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
- Mystic Iron Works, Everett, Mass.
- M7 Milton Steel Products Div., Milton, Pa.
- M8 Mill Strip Products Co., Evanston, Ill.
- M9 Moltrup Steel Products Co., Beaver Falls, Pa.
- NI National Supply Co., Pittsburgh
- N2 National Tube Div., Pittsburgh
- Northwestern Steel & Wire Co., Sterling, Ill.
- Northwest Steel Rolling Mills, Seattle N6
- Newman Crosby Steel Co., Pawtucket, R. I.
- Carpenter Steel of New England, Inc., Bridgeport, Conn. N8
- N9 Nelson Steel & Wire Co.
- 01 Oliver Iron & Steel Co., Pittsburgh
- 02 Oregon Steel Mills, Portland
- P1 Page Steel & Wire Div., Monessen, Pa.
- P2 Phoenix Steel Corp., Phoenixville, Pa.
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
- Pittsburgh Coke & Chemical Co., Pittsburgh
- PS Pittsburgh Screw & Bolt Co., Pittsburgh P6 Pittsburgh Steel Co., Pittsburgh
- Portsmouth Div., Detroit Steel Corp., Detroit
- Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Cal.
- P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- P13 Phoenix Mfg. Co., Joliet, Ill.
- P14 Pacific Tube Co.
- P15 Philadelphia Steel and Wire Corp.
- R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
- Republic Steel Corp., Cleveland
- R4 Roebling Sons Co., John A., Trenton, N. J. R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
- R6 Rodney Metals, Inc., New Bedford, Mass.
- R7 Rome Strip Steel Co., Rome, N. Y.
- SI Sharon Steel Corp., Sharon Pa.
- S2 Sheffield Steel Div., Kansas City
- Shenango Furnace Co., Pittsburgh
- S4 Simonds Saw and Steel Co., Fitchburg, Mas.
- Sweet's Steel Co., Williamsport, Pa. 55
- Stanley Works, New Britain, Conn.
- Superior Drawn Steel Co., Monaca, Pa.
- 59 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
- \$10 Seneca Steel Service, Buffalo
- Southern Electric Steel Co., Birmingham SII
- S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
- \$13 Seymour Mfg. Co., Seymour, Conn.
- TI Tonawanda Iron Div., N. Tonawanda, N. Y.
- Tennessee Coal & Iron Div., Fairfield 72
- Tennessee Products & Chem. Corp., Nashville
- 74 Thomas Strip Div., Warren, O. T5 Timken Steel & Tube Div., Canton, O.
- Texas Steel Co., Fort Worth
- T8 Thompson Wire Co., Boston
- UI United States Steel Corp., Pittsburgh
- U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
- U3 Ulbrich Stainless Steels, Wallingford, Conn.
- U4 U. S. Pipe & Foundry Co., Birmingham
- W1 Wallingford Steel Co., Wallingford, Conn.
- W2 Washington Steel Corp., Washington, Pa.
- W3 Weirton Steel Co., Weirton, W. Va.
- W4 Wheatland Tube Co., Wheatland, Pa.
- W5 Wheeling Steel Corp., Wheeling, W. Va. W6 Wickwire Spencer Steel Div., Buffalo
- W7 Wilson Steel & Wire Co., Chicago.
- W8 Wisconsin Steel Div., S. Chicago, Ill.
- W9 Woodward Iron Co., Woodward, Ala.
- W10 Wyckoff Steel Co., Pittsburgh W12 Wallace Barnes Steel Div., Bristol, Conn.
- YI Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per net ton.

							BUTT	WELD										SEAN	ILESS			
	1/2	la.	3/4	In.	11	in.	11/4	In.	11/2	In.	2	ln.	21/2-3	3 In.	2	In.	21/	ln.	3	in.	31/2-	4 ln.
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.
Sparrows Pt. B3 Youngstown R3	0.25 2.25 *10.75	113.0	3.25 5.25		6.75 8.75 +4.25	*6.50 *4.50 *17.50	9.25 11.25	+5.75 +3.75	9.75 11.75 +1.25	+4.75 +2.75 +15.75	10.25 12.25 *0.75	+2.25	13.75	+2.50								
Pittsburgh J3	2.25 0.25	*13.0 *15.0	5.25 3.25	*9.0 *11.0	8.75 6.75	*4.50 *6.50	11.25	+3.75 +5.75	11.75	*2.75 *4.75	12.25	*2.25 *4.25	13.75	+4.50		*27.25						*18.50
Sharon M3	2.25 0.25 2.25	*13.0	5.25 3.25 5.25	19.0	8.75 6.75 8.75	*4.50 *6.50 *4.50	9.25 11.25	*3.75 *5.75 *3.75	9.75 11.75	*2.75 *4.75 *2.75	12.25 10.25 12.25	*4.25 *7.25	11.75 13.75		*12.25	*27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling W5	2.25 2.25 2.25	*13.0 *13.0	5.25 5.25 5.25	*9.0 *9.0	8.75 8.75 8.75	+4.50	11.25 11.25 11.25	*3.75 *3.75 *3.75	11.75 11.75 11.75	*2.75 *2.75 *2.75	12.25 12.25 12.25	*2.25 *2.25	13.75 13.75		+12.25	+27.25	+5.75					*18.50
Indiana Harbor Y1 Lorain N2	1.25 2.25		4.25 5.25		7.75 8.75		10.25	*4.75 *3.75	10.75	*3.75 *2.75	11.25 12.25			*3.50 *2.50		+27.25	+5.75	*22.50	+3.25	+20.0	+1.75	+18.50
PLAIN ENDS Sparrows Pt. B3	4.75	*9.0	8.75	+5.0	11 75	+0 50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Youngstown R3	6.75	+7.0	10.75		13.75	1.50	14.25	0.25	14.75					0.50								
Fairless N2	4.75	*9.0	8.75	*5.0		*0.50	12.25	+1.75		*0.75		+0.25		+1.50								
Fontana K1	*6.25 6.75	+7.0	*2.25 10.75	+3.0	0.75 13.75	1 50	1.25	0.25	1.75	1.25	2.25	1.75	2.75 15.75	0.50	918 T	*24.75	+9 91	+19 6	+8 75	+16 Sa	4.25	+11 50
Alten, III. L.	4.75				11.75	+0.50	12.25	+1.75	12.75				13.75	*1.50	10. 8	24.13	3.4	13.0	0.10	10.30	4.00	
Sharon M3	6.75	+7.0	10.75	*3.0	13.75		14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.54								122722
Pittsburgh N/	6.75	*7.0			13.75	1.50	14.25	0.25								\$ +24.75						*11.50
Wheeling W5	6,75	*7.0 *7.0	10.75		13.75	1.50	14.25	0.25	14.75					0.56								
Youngstewn Y/	6.75	+7.0			13.75		14.25							0.50		5 +24.73	*3.2	*19.6	+0.75	*16.50	4.25	+11.50
Indiana Harbor Y1	5.75	*8.0	9.75		12.75		13.25							40.56					40 70	****	4 95	411 Ea
Levain N2	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	10.7	5 *24.75	-3.Z	19.0	-0.75	*16.50	4.25	*11.50

1 Threads only, buttweld and seamless, 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount. Galvanisad discounts based on zinc price range of ever 9¢ to 11¢ per lb. East St. Leuis. For each 2¢ change in zinc, discounts very as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1¼ and 2-in., 1½, pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of ever 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range ever 7¢ to 9¢ would increase discounts. East St. Leuis zinc price new 11.00¢ per lb.

(Effective March 23, 1959)

TOOL STEEL

F.o.b.	mill					
W	Cr	V	Mo	Co	per lb	SAE
18	4	1	-	_	\$1.84	T-1
18	4	1	-	. 5	2.545	T-4
18	4	2	-	_	2.005	T-2
1.5	4	1.5	8	-	1.29	M-1
6	4	3	6	-	1.59	M-3
6	4	2	5	_	1.345	M-2
High-	carbo	n chr	omiu	m	.955 D	-3, D-5
Oil hi	ardene	ed ma	ngan	ese	.505	0-2
Speci	al car	rbon			.38	W-1
Extra	carl	on .			.38	. W-1
Regu	lar ce	arbon			.325	W-1
Win	rohou	DO DE	lage o	n and	and of	Micaio.

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL Base prices, cents per lb f.o.b.

		Plate (L4, C4, .	43, J2)	Sheet (12)
	Cladding	10 pct	15 pct	20 pct	20 pct
	302				37.50
	304	28.80	31.55	34.30	40.00
1	316	42.20	46.25	50.25	58.75
Stainless Type	321	34.50	37.75	41.05	47.25
aji (347	40.80	44.65	48.55	57.00
й	405	24.60	26.90	29.25	
	410	22.70	24.85	27.00	
	430	23.45	25.65	27.98	*****

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb		No. I Std.	Rails		I ish Rails	Tribus water		Lates Barn	Joint Dars		Irack Spilles		Tie Plains			Truck Balls	Untreated
Bessemer UI	5	. 7	5	6	. 7	25	7	. 1	25								
Cleveland R3	1.			1			1.								1	5.	35
So. Chicago R3 Ensley T2 Fairfield T2				Ľ			Ľ			10	. 10	1			Г.		
Engley T2	5	. 7	5	6	7	25	ľ			-							
Fairfield 72	1		-	6	. 7	25	ľ	•		10	.10	6	8	75			
Gary UI	5	. 7	5	1			Ľ	•		-		6	8	75	ľ		
Ind. Harbor 13	1			Ľ			1	•		10	. 10	-					
Johnstown B3	Τ.			6	. 7	25	1.										
Joliet I/I	.1.			1	•		2	1	25								
Kanasa City S2							ľ	.,	_	10	. 10				i	Ġ.	35
Joliet UI Kansas City S2 Lackawanna B3	15	1	5	è	1	25	7		25			ė		75			-
Lebanon R3	.		-		٠,	-	7	1	25			0			i	Ė	25
Lebanon B3 Minnequa C6	İç	1	15	9	9	95	7	ij	95	10	10	ic	ė	75	1	5	25
Pittaburgh P5	1		-	ľ			1.	• •							i	A	75
Pittaburgh 13	1			i.			1			10	. 10	1			ľ		
Seattle B2	1			1.			1.	•				6	7	5	1		
Seattle B2 Steelton B3	İŝ		15	I.			17	ů	25								
Struthers Y1	1		-	1			ľ	-	_	10	. 16	1		-	1	-	
Torrance C7	1			1.			1.	۰		1							
Williamsport S5	1.	0 1		6		725	1			 							
Youngstown R3																	
. wangstown ro	.1.	0 1		1.			1.			 140		1	* *		1.	* 1	

COKE

Furnace, beehive (f.o.b.) Net- Connellsville, Pa \$14.50 to \$15	Con
Foundry, beehive (f.o.b.)\$18	.50
Foundry oven coke	
Buffalo, del'd\$33	.25
Detroit f.o.b 32	
	.55
New Haven, f.o.b 31	.00
Kearney, N. J., f.o.b 31	
	.00
	.00
	.35
	.00
Cleveland, del'd 34	.19
	.84
	.25
	.00
Birmingham, f.o.b 30	
Milwaukee, f.o.b 32	
Neville Is., Pa 30	.75

LAKE SUPERIOR ORES

51.50% Fe lower Lake Freight oh	porta.	1	7	ic	6	8	1	01	-	1	9	59	season.
Openhearth	lump												
Old range.													
Old range,													
Mesabi, best	semer												11.60
Mesabi, non	bessen	ne	r			۰				D			11.45
High phosph													

ELECTRICAL SHEETS

22-Gage	Hot-Rolled	Cold-Reduced (Coiled or Cut Lengt			
F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed		
Field Armature Elect. Special Motor Motor Dyname Trans. 72	11.70 12.40 13.55 14.65 15.70	9.875 11.20 11.90 12.475 13.05 14.15	11.70 12.40 13.55 14.65 15.70		
Trans. 65	16.30	Grain (riented		
Trans. 58 Trans. 52	16.80 17.85	Trans. 80 Trans. 73 Trans. 66	20.20		

Producing points: Aliquippa (J3); Beach Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (J3); Mansfield (E2); Newport, Ky. (A9); Niles, O. (S1); Vandergrift (U1); Warren, O. (R3); Zanesville, Butler (A7).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

(GRAPHITE	1	CARBON*							
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price					
24	84	27.25	40 35	100, 110	12.50					
24 20 18 14 12 10	72 72	26.50 27.50	35	110	11.20					
14	72	27.25	30 24	72	11.95					
12	72	28.25	20	90 72	11.55					
10	60	29,50	17	72	12.10					
10	48	30.00	14	72	12.55					
-	60	29.75	10	60	13.80					
7	40	37.00		60	14.63					
3	40	39.25		1 1						
23/6	30	41.50		1 1						
2	24	64.00								

· Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads:	per 1000
Super duty, Mo., Pa., Md., Ky	
High duty (except Salina, Pa.,	•
add \$5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa.,	
add \$2.00)	103.00
Ground fire clay, net ton, bulk	22.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala	\$158.00

Mt. Union, Pa., Ensley, Ala. \$158.00 Childs, Hays, Latrobe, Pa. 163.00 Chicago District 168.00 Western Utah 183.00 California 165.00 Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville

163.00-	
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chi-	
cago	26.75
Silica cement, net ton, bulk, Ens-	
ley, Ala	27.75
Silica cement, net ton, bulk, Mt.	
Union	25.78
Silica cement, net ton, bulk, Utah	
and Calif	39.00

Chrome Brick		Per net ton
	nically bonded,	
iner, Calif.		119.00

Magnesite Brick

Grain	Ma	gn	e	si	i	e		82	38	1	%	t	0	1/2	i	n.	g	TI	air	18	
Domes	tic,	f.c	0.	b.													. 1	17	3.6	00	
Luni in b																		4	6.0	00	
in s																		-5	4.0	00	

Dead Bur	ned D	olomit	e	Per	net ton
F.o.b. bul Pa., W	k, pro	ducing	points	in:	\$16.75
Missour	l Vall	еу			15.60
Midwes					17.00

(Effective March 23, 1959)

MERCHANT WIRE PRODUCTS

	Standard Q Coated Nails	Weven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.e.b. Mill	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Bartouville K2** Buffale W6. Chicage N4** Chicage R3. Cieveland A6. Crawf'dav. M4** Donora, Pa. A5. Duluth A5. Pairfield, Als. Pairfield, Als. Jacksonville M4. Jehnatown B3** Jeliet, Ill. A5. Kokomo C9. L Angeles B2** Kansas City S2** Minnequa C6. Moneasen P6. Palmer, Mass. W6. Pittaburg, Cal. C7. Rankin, Pa. A5. Sa. Chicage R3. S. San Fran. C6. SparrowsPt. B3** Struthers, O. Y1**	173 175 177 177 177 173 173 173 173 173 174 178 184-1 173 173 175 178 178 178 178 178 178 178 178 178 178	192 187 187 187 192 197 199 187 189 192 192 216 187 187	178	214 214 212 212 212 212 217 219 212 217 217 217 217 217	196 	9.00 8.75 9.10 9.00 9.00 9.00 9.10 9.25 9.10 9.25 9.10 9.25 9.10 9.25 9.25 9.25 9.25 9.25 9.25 9.25	9,775 9,55 9,55 9,55 9,675 9,675 9,675 9,675 9,675 9,80† 9,325 9,85* 10,15 9,325 9,85* 10,55 9,55
Worcester A5 Williamsport S5.							

• Zinc less than .10¢. • • • .10¢ zinc. • • 11-12¢ zinc. † Plus zinc extras. ‡ Wholesalers only.

C-R SPRING STEEL

		CARB	ON CO	NTENT	Г
Cents Per Lb F.e.b. Mill	0.26- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06-
Anderson, Ind. G4		10.40		15.60	18.55
Baltimore, Md. 78		10.70		15.90	18.85
Bristol, Conn. W/2		10.70		16.10	19.30
Boston 78			12.90	15.90	18.85
Buffalo, N. Y. R7			12,60	15.60	18.55
Carnegie, Pa. S9	8.95		12.60	15,60	18,55
Cleveland A5	8.95	10.40	12,60	15.60	18.55
Dearborn S1	9.85	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dover, O. G4	8.95	10.40	12.60	15.60	18.55
Evanaton, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. 78	9.05	10.40	12.60	15.60	
Harrison, N. J. C/1			12.90	16.10	
Indianapolis R5	9.10	10.55	12.60	15.60	18.5
Los Angeles Cl	11.15	12.60	14.80	17.80	
New Britain, Conn. S.		10.70	12.90	15.90	18.8
New Castle, Pa. B4.		10.46	12.60	15.60	
New Haven, Conn. D		10.70	12.90	15.90	
Pawtucket, R. I. N7.		10.70	12.90	15.90	18.8
Riverdale, Ill. Al		10.46	12.60	15.60	18.5
Sharon, Pa. S1	8.95	10.46	12.60	15.60	18.5
Trenton, R4		10.70	12.90	16.10	19.3
Wallingford W1			12.90	15.90	18.5
Warren, Ohio T4		10.40	12.60	15.60	
Worcester, Mass. A5			12.90		
Youngstown R5			12.60		18.5

BOILER TURES

S per 100 ft, carload lots	Si	ize	Sean	nless	Elec. Weld
cut 10 to 24 ft. F.o.b. Mill	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.
Babceck & Wilcox	2 21/2 3 31/2 4	13 12 12 11 11	40.28 54.23 62.62 73.11 97.08	73.40	35.22 47.43 54.77 63.93 85.53
National Tube	2 21/2 3 31/2 4	13 12 12 11 11	40.28 54.23 62.62 73.11 97.08		35.22 47.43 54.77 63.93 85.53
Pittsburgh Steel	2 21/2 3 31/2	13 12 12 11 10	40.28 54.23 62.62 73.11 97.68	63.57 73.40 85.70	

59

NOW YOU CAN GRIND AND FINISH V



Illustrations above show Bayflex Double-Duty in action, held at correct angle for weld bead grinding (top) and for finishing (bottom)

SH WITHOUT CHANGING WHEELS!



There are two important angles to consider before you buy new weld-grinding or finishing wheels. Bay State's new Bayflex Double-Duty raised hub disc-wheel has them both!

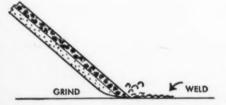
The "DD's" unique, two-layer construction gives you two grinding angles: One is 30°-45° which gives you fast stock removal for grinding weld beads... and the other is 10°-20° which gives you a finish without gouging, a finish so smooth it's just short of a polished surface.

The upper layer for weld grinding comes in a single, standard specification. The lower finishing or blending layer comes in your choice of five different grits (24, 36, 54, 80 and 120) for every type of finishing job from heavy steels through light stainless sheets to aluminum and copper.

Your Bay State representative is ready now to demonstrate the Bayflex Double-Duty in your plant under normal working conditions. Get in touch with him and see what he can do to cut costs and speed up your weld

grinding. You'll find he's more than a good salesman ... because he's an experienced abrasive specialist, too. Better grinding at lower cost ... that is his business.

IS 2 WHEELS IN 1



Upper layer removes stock rapidly when disc is held at 30° - 45° angle.



Lower layer smooths and blends surface when held at 10° - 20° angle.

BAY STATE ABRASIVES



Bay State Abrasive Products Co., Westboro, Mass.
In Canada: Bay State Abrasive Products Co., (Canada)
Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland,
Detroit, Pittsburgh, Los Angeles.
Distributors: All principal cities

ttom1

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsbero, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R3	62.00	62.50*	******	*** ***	*****
Birmingham W9	62.00	62.50°	66.50		*** **
Birmingham U4	62.00	62.50*	66.50		
Buffalo R3	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Iluffalo Wo	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago 14	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth 14	66.00	66.50	66.50	67.00	71.00
Erie 14	66.00	66.50	66.50	67.00	71.00
Everett M6	67.50	68.00	68.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7.	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7.	66.00	66.50			
Midland C//	66.00				
Minnegus C6	68.00	68,50	69.00		
Monessen P6	66.00				
Neville Is. P4	66,00	66.50	66.50	67.00	71.00
N. Tonawanda T/		66.50	67.00	67.50	
Sharpaville S3	66,00		66.50	67.00	
So. Chicago R3	66.00	66,50	66.50	67.00	
So. Chicago W8 .	66.00		66.50	67.00	*****
Swedeland A2	68.00	68.50	69.00	69.50	
Toledo /4	66-00	66.50	66.50	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	73.00
Youngstown YI.			66.50		-5100

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.09 pct) 30¢ per ten for each 0.25 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.69 pct phos.

Add \$1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, 14
(Globe Div.), \$78.00. Ningara Falls (15.01-15.50), \$101.00;
Keokult (14.01-14.50), \$102.50; (15.51-16.00), \$106.50.
Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manmanese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); \$364.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	-	28.00	41.25	33.50	38.50	-	17.50	-	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	-	22.25	-	22.50
Billets, forging	-	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.7
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-	31.0
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.7
Strip, hot-rolled	36.90	39.00	37.25	40.50	_	44.25	69.25	53.50	63.50	-	31.00	-	32.0
itrip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40-7
Vire CF: Rod HR	_	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.7

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., CII; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., UI; Washington, Pa., W2, J2; altimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, UI; Bridgeville, Pa., U2; New Castle, Ind., I2; Detroit, M2; Baltimore, El; M. Louisville, O., R5.

Strip: Midland, Pa., Cl1: Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detrost, M2; Detroit, S1; Canton, Massillon, O., R3; Harrison, N. J., D5; Youngstown, R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus three conversion extras); W1 (25¢ per lb. higher); Seymour, Conn., S13, (25¢ per lb. higher); New Bedford, Mass., R6; Gary, U1, (25¢ per lb. higher)

Bar: Baltimore, AI; S. Duquesne, Pa., UI; Munhall, Pa., UI; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., I2; McKeesport, Pa., UI, FI; Bridgeville, Pa., U2; Dunkirk, N, Y., A3; Massillon, O., R5; S. Chicago, UI; Syracuse, N, Y., CII; Watervliet, N, Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayne, I4; Detroit, R5; Gary, UI; Owensboro, Ky., G5; Bridgeport, Conn., NB.

Wire: Waukegan, A5; Massillon, O., R5; McKeesport, Pa., F1; Ft. Wayne, J4; Newark, N. J. D2; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2; Detroit, R5.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Baltimore, El; Brackenridge, Pa., A3; Chicago, Ul; Munhall, Pa., Ul; Midland, Pa., CII; New Castle, Ind., 12; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., CI5; Vandergrift, Pa., Ul; Gary, Ul.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8.

(Effective March 23, 1959)





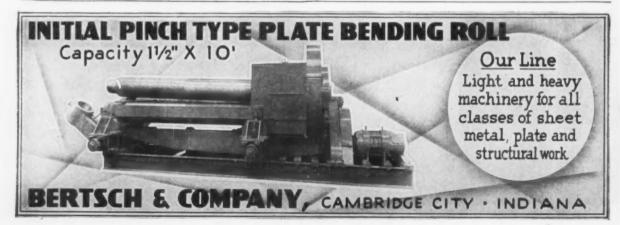
WESPO

T-BOLTS & BOLSTER BOLTS ALLOY STEEL 150,000 LBS. TENSILE STRENGTH T-Bolts-1/2", 5/8", 3/4", 1/8", 1" Body Diameters Bolster Bolts to J.I.C. Standards

Special bolts available to 11/2" body diameter and 3" Square Head. All bolts except 1/2" and 5%" available with Hexagon Heads . . . Hardened Nuts and Ground Washers available for all size bolts.

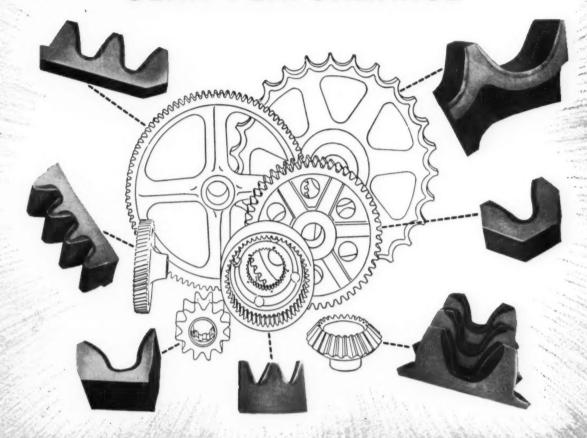
Write for bulletin-prices

WEST POINT MFG. CO. 26943 West 7 Mile Road . Detroit 19, Michigan

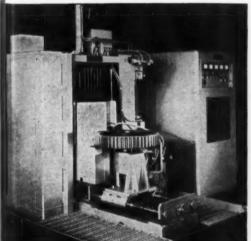


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PATTERNS FOR IMPROVED GEAR PERFORMANCE



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This Magnethermic Induction Gear Machine scans each tooth.

All kinds of savings with this Magnethermic method ... low power and limited initial investment. Improved physical properties, particularly in the critical root zone, in many cases allow use of smaller gears or change-over from expensive alloy steels to plain carbon grades.

Distortion minimized with only a small part of the gear heat affected; no over-all compressive forces.

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With automatic indexing, attention is confined to loading and unloading . . . cumulative positioning errors are eliminated.

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FERROALLOY PRICES

FERROALLOY PRICES		
Ferrochrome Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si. 0.02% C 41.00 0.50% C 38.00 0.05% C 39.00 1.00% C 37.75 0.10% C 38.50 1.50% C 37.50 0.20% C 38.25 2.00% C 37.25 4.00-4.50% C, 0.67-70% Cr, 1-2% Si 28.75 3.50-5.00% C, 57-64% Cr, 2.00-4.50% 28.25	Spiegeleisen Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa. Manganese Silicon 16 to 19% 3% max \$100.50 19 to 21% 3% max 102.50 21 to 23% 3% max 105.00	Alaifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb. Carloads, bulk 9.85¢ Ton lots 11.20¢ Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo
4.00-4.50% C, 60-70% Cr, 1-2% S1. 28.75 3.50-5.00% C, 57-64% Cr, 2.00-4.50% S1 28.25 0.025% C (Simplex) 36.75 8% max C, 50-55% Cr, 6% max Si. 25.75 4½% max C, 50-55% Cr, 2% max Si. 26.50	Manganese Metal 2 in. x down, cents per pound of metal delivered. 95.50% min. Mn, 0.2% max. C, 1% max. Sl, 2.5% max. Fe. Carload, packed	Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb. Ton lots
High Nitrogen Ferrochrome Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome	Electrolytic Manganese	Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta \$3.40
max. 0.10% C price schedule.	F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	Ferromolybdenum, 55-75%, 200- lb containers, f.o.b. Langeloth, Pa., per pound contained Mo \$1.76
Chromium Metal Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe. 0.10% max. C	Carloads 34,00 Ton lots 36,00 250 to 1999 lb 38,00 Premium for Hydrogen - removed metal 0.75	Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, per gross ton
Per 1b of metal 2" x D plate (%" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max. \$1.15	Medium Carbon Ferromanganese Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn	Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti
Ton lots	Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%. Carloads Ton Less 0.07% max. C, 0.06% (Bulk)	Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti \$1.50 Less ton lots
packed. Price is sum of contained Cr and contained Si. Cr Si Carloads, bulk	0.07% max. C, 0.06% (Bulk) P, 90% Mn 37.15 39.95 41.15 0.07% max. C 34.35 37.15 38.35 0.15% max. C 34.35 37.15 38.35 0.15% max. C 32.60 36.40 37.60 0.30% max. C 32.10 34.90 36.10 0.50% max. C 31.60 34.40 35.60 0.75% max. C, 80.85% Mn, 5.0-7.0% S1 28.60 31.40 32.60	Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton
Ton lots	Mn, 5.0-7.0% S1 28.60 31.40 32.60	W, ton lots delivered \$2.15 (nominal)
Colcium-Silicon Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe. Carloads, bulk. 24,00 Ton lots 27,95 Less ton lots 29.45	Silicomanganese Lump size, cents per pound of metal, 65-68% Mn, 18-20% Sl, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping	Molybdic exide, briquets per lb contained Mo, f.o.b. Langeloth, Pa
Calcium-Manganese—Silicon Cents per lb of alloy, lump, delivered, packed. 16.20% Ca. 14.18% Mp. 53.59% Si	Carloads bulk 12.80 Ton lots, packed 14.45 Carloads, bulk, delivered, per lb of briquet 15.10 Eriquets, packed pallets, 3000 lb up	Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb. Carload, bulk lump 18.50¢ Ton lots, packed lump 20.50¢ Less ton lots 21.00¢
Carloads, bulk 23.06 Ton lots 26.15 Less ton lots 27.15	to carloads 16.30	Vanadium oxide, 86-89% V ₃ O ₆ per pound contained V ₃ O ₆ \$1.38
SMZ Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh. Ton lots 21.15	Silvery Iron (electric furnace) Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk 26.25¢ 12-15%, del'd lump, bulk- carloads
Less ton lots 22.40	Silicon Metal	Borosil, per lb of alloy del. f.o.b.
V Foundry Alloy Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Sl, 8-11% Mn, packed.	Cents per pound contained SI, lump size, delivered, packed. Ton lots, 98.25% SI, 0.50% Fe 24.95 23.15 23.15	Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb con- tained B 2000 lb carload
Si, 8-11% Mn, packed. Carload lots	Silicon Briquets	Bortram, f.o.b. Niagara Falls. Ton lots per pound 45¢ Less ton lots, per pound
Graphidox No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%,	Cents per pound of briquets, bulk, de- livered, 40% Si, 2 lb Si, briquets. Carloads, bulk 8.00 Ton lots, packed 10.80	Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed. Ton lots per pound 14.00¢
Ca 5 to 7%. 19.20 Carload packed 21.15 Less ton lots 22.40	Electric Ferrosilicon Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. 50% Si 14.60 65% Si 15.75 85% Si 18.60 90% Si 20.00	Ferroboron, 17.50 min. B, 1.50 % max. Sl, 0.50 % max. Al, 0.50 % max. C, 1 in. x D, ton lots \$1.20 F.o.b. Wash., Pa., Niagara Falls, N. Y., dellvered 100 lb up 10 to 14% B
Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Cents Producing Point	Ferrovanadium	10 to 14% B
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore	50-55% V delivered, per pound, contained V, in any quantity. Openhearth	No. 1 \$1.05 No. 79 50¢ Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x
S. Duquesne	Calcium Metal Eastern zone, cents per pound of metal, delivered.	D, del'd. Ton lots (packed)
Briquets, delivered, 66 pct Mn: Carloads, bulk	Cast Turnings Distilled Ton lots	Nickel-Boron, 15-18%, B. 1.00%, max. Al, 1.50% max. Si, 6.50%, max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

(Effective March 23, 1959)

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TENSILE AND YIELD STRENGTH , PSH

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Ni-Resist ductile irons offer you new combinations of useful engineering properties

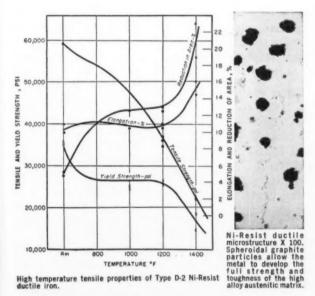
Ni-Resist* ductile irons are a new family of versatile high-alloy cast irons developed by Inco. Containing 18 to 36% Nickel, they provide the same high order of corrosion and heat resistance given by Ni-Resist flake graphite iron...plus high levels of strength and ductility.

There are several types of Ni-Resist ductile iron. Each one combines a useful array of engineering properties.

Strength Ni-Resist ductile irons provide tensile strengths of 55,000 to 80,000 psi, yield strengths of 30,000 to 44,000 psi. See graph of properties below.

Toughness Ni-Resist ductile irons give elongations of 4 to 40%, together with good impact resistance. The photomicrograph below shows why – spheroidal graphite particles allow formation of an austenitic matrix. This nickel alloy matrix develops full ductility and strength... keeps these properties at low temperatures.

Corrosion resistance Ni-Resist ductile irons safely handle hundreds of corrosives. Under most conditions – with acids, alkalies and salts – their performance is far superior to both cast iron and steel, helping you reduce maintenance costs.



High temperature properties
Ni-Resist ductile irons form a tightly adhering scale at

Ni-Resist ductile irons form a tightly adhering scale at elevated temperatures, greatly reducing further oxidation. They resist heat effects up to 1400°F and higher, have excellent thermal shock resistance. From 1100° to 1300°F, Type D-2 has stress rupture properties equal to those of cast HF stainless steel.

Wear resistance Ni-Resist ductile irons have a work hardening austenitic matrix. Graphite particles provide dry lubrication. Both properties work together to resist wear and galling over a wide temperature range.

Erosion resistance Ni-Resist ductile irons work well in wet steam, brine or salt slurries, and high velocity liquids. Their high strength and resistance to cavitation-erosion mean long service life for pump parts.

Controlled expansion Ni-Resist ductile irons have thermal expansivities from about 2.5 up to 10.4 millionths per degree F. You can match them with steels, cast irons, Nickel, Monel* alloy...with aluminum, copper, bronze and stainless steel.

Non-Magnetic properties Ni-Resist ductile irons, Types D-2 and D-2C, are non-magnetic and therefore useful where excessive heat and power losses must be avoided.

Machinability Ni-Resist ductile irons machine as well as common pressure-type gray iron, thanks to the presence of graphite in their structure.

Fluidity in casting Ni-Resist ductile irons have good flowing qualities and permit the making of intricate designs.

These are only the highlights. You can get all the facts on this versatile new family of metals by asking us for "Engineering Properties of Ni-Resist Ductile Irons." This 28-page booklet details engineering properties and commercial applications with numerous photos, tables, and graphs . . . gives you the information you need to decide how Ni-Resist ductile irons can help you. You'll also get "Buyers' Guide for Ni-Resist and Ni-Resist Ductile Iron Castings", listing foundries authorized to produce them.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N.Y.

NI-RESIST DUCTILE IRONS

NICKEL ALLOYED IRONS PERFORM BETTER LONGER

ELECTRICAL POWER EQUIPMENT IN STOCK DC MOTORS

Qu.		Make	Туре	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	3000	New Whae.	Enc. F.V.	525	600
1	2250	New Elliott	Enc. F.V.	600	2010/3/90
1	2200	G.E.	MCF	600	400/500
ī	1750	New Elliott	Fro F V	250	175/359
8	1500	New Whee.	Enc. F.V.	525	600
1	1300	G.E.	MCF-12		
				300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whee.		500	800/2000
1	940	Whae.	QM	250	140/170
2	940	S.S.	Eng. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
3	765	Allis Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/800
1	750	G.E.	MCF	600	300/720
î	750	G.E.	M. F.	600	120/390
A.	645	5.5.		300	1000
2	600	Whse.	Enc. F.V.		
1 1 2 4 1 3 2 3				250	275/550
1	500	G.E.	MPC-10	250	188/400
3	450	Whse.		530	415
2	400	G.E.	CY-275	300	1000/1500
3	325	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
2	275	G.E.B.B.	TLC-108	250	2000/4000
1	225	G.E.B.B.	AMC AUG	250	1150/3600
î	200	Rel. B.B.	T-664-D.P.	240	850
1	200	Whae,	CB-207-4	250	850/1200
1	150	Cr. Wh.		250	
			CMC-65H	230	1150
1	150	G.E.B.B.	TLC-74	250	1150/3500
1	150	G.E.B.B.	CD	600	250/750
1	120	G.E.B.B.	TLC-50	250	
1	125/250	New Whae.	CB-210.3	230	300/1200
1	120	Rel. B.B.	1050T	230	575/900
2	125	Whse.	SK-190	230	450/1200
1	125	White.	SK-185	230	350/1050
î	100	G.E.	CDP-145	230	1750
1	80	Whse.			
			SK-123.9	240	2000/4500
1	75 .	G.E.B.B.	CD-1235-D.		850
1	60/75	Rel. B.B.	T-664-D.P.	240	300/1200
1	50	G.E.	CD-1136	230	
1	40	Rel. B.B.	TY-663	240	300 1200
1	30/40	Whise, B.B.	SK-131, TE	FC	
				250	500/1500
1	25/33	Rel. B.B.	TY563	240	300/1200
6	40	Rel. B.B.	385F, TEFC		500/1500
1	30/40	Rel. B.B.	T-564-D.P.	240	300 900
	20/40	144.1. 43.15.	A -001 U.F.	540	200 300

MERCURY ARC RECTIFIERS

3-150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
2-150 KW, G.E., Ignitron, 245 V. D.C.—230 V. A.C., air cooler transformers with controls.

MG SETS-3 Ph. 60 Cy.

Qu.	K.W.	Make	прм	Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	S.S. 3 unit	720	600	11000/6600
1 1 1 1	1500	Cr.Wh.	1 40	000	71000,0000
-		4 unit	720	100	2300
1	500	G.E.	900	125/250	
1	350	G.E.	900		0/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	960	125	220/440
1	200	Whae.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
1	140	Cr. Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/845
1	100	Cr.Wh.	1800	240	440
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100	Cr. Wh.	1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whee.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	CA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Kuhl	OISC	1	12000 4 8600
6	333	G.E.	HS	1	7200/12470YX
					3409/4160Y
3	333	G.E.	OISC	3	3400/4160Y x 600
3	150	G.E.	OISC	- 1	3300x2300/4000Y
3	100	G.E.	HS	1	480/8320/120/240
1	50	Mel.	OISC	3	13200 x 240-480
3	100	L.M.	LA	1	4160/7200x240/480

CRANE & MILL MOTORS

Qu.	H.P.	Make	RPM	Type		
13	12/14	Whse.	700/600	MCA-30, Series		
1	20	Whse.	975	K-5 Series		
2	23	G.E.	650	MDS-408		
2 2 1	25	G.E.	7.25	CO-1808, Series		
1	35	Whse.	480	CK-9 Comp. S.B.		
1	35	Whee.	480	CK-9 Sh. R.B.		
1	45	Whse.	556	CK-9 Comp. 8.B.		
3	50	G.E.	650	COM-1830 Comp.		
3	50	Whse.	525	CK-9 Shunt R.B.		
2	50	Whse.	600	CK-9 Comp. R.B.		
1	50	G.E.	525	COM-1830AEB.B.		
1	60	Cr. Wh.	550	SW-50 Comp.		
1	100	G.E.	475	CO-1832 S.B.		
6	100/140	Whae.	500/415	MC-90 R.B.		

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THE CLEARING HOUSE

Missile Work Spurs West Coast Sales

Used machinery demand in the California market is moving up, prodded mainly by missile and electronics activity.

Seattle sales are aided by construction boom.

• There's plenty of activity for used machinery dealers up and down the West Coast. Inquiries are up. Sales are up. And it takes a lot of hustle and bustle to dig up enough machines to meet the strong demand.

Missile development and the electronics industries in the Southern California area are behind the current demand for the best sellers. Most needed are engine lathes, in 16-in.-and-up sizes for short run production. And there are calls for turret lathes, suggesting somewhat longer production runs. Post-World War II models are selling well.

Hot Sellers — Shears and press brakes are still the hottest sellers. Late-model machines in good shape will bring near-new prices.

The government is kicking loose some machines from various West Coast storage centers. But there is little demand in the market for machines which are too old.

Northern California dealers say sales are improving. The number of inquiries has increased and more "lookers" are buyers now than in the past several months.

Foreign Competition — Sales of foreign equipment are fairly brisk. Price on such merchandise is often under that of good used machinery.

Parts and service, at one time the chief obstacle in selling foreign machinery, now are good. Quality, it is reported, has improved considerably, with machines from West Germany, Scandanavia, and England rated among the better equipment.

Some dealers report volume now is up 20 pct to 30 pct over the same period of last year. One dealer, deep in the doldrums a month ago, said business is improving and the outlook is for continued gains.

Some Supply Problems — Although some dealers report shortages of good used special tools, others indicate an ample supply. They buy these tools back East when they have a specific order. Lathes, presses, and milling machines are standout movers.

Boom in the North—The used machinery market in Seattle is booming, after a long winter. With spring, business is perking up.

Heavy equipment, for the first time in almost a year, is showing definite signs of life. Purchasers are replacing machines they've been holding onto for longer than normal.

In Seattle all signs point to a top-notch year. Construction is booming on homes, office buildings, and governmental projects.

For the first time in months there is a definite demand for almost all kinds of used machines, prices are up and demand is steady. There are no shortages that can be detected. "One of a kind" items such as heavy milling machines move regularly.

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EQUIPMENT CONSIDER GOOD USED FIRST

| BENDING ROLLS | 10' x 10 Ga. Bertach No. 6 Initial Type | 10' x 10 Ga. Bertach No. 6 Initial Type | 12' x ½" Hilles & Jones Pyramid Type | 14' x 1 3/16" Bertach Initial Type | 32' x ¾" BALDWIN PYRAMID TYPE—LATE | 13' x ½" BALDWIN PYRAMID TYPE—LATE | 18' x ½" BALDWIN PYRAMID TYPE—LATE | 18' x 10' on Shaw 48' Span 230 Volt D.C.
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13 ton N.B.P 100' Span 230 Volt D.C.
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2700 bb. Draw Bench 16: 16: Draw
35,000 lb. Draw Bench 20: 16: Draw
35,000 lb. Draw Bench 41 ft. Draw
48' Span 230 Volt D.C.
49' Span 230 Volt D.C.
49' Span 230 Volt D.C.
40' Span 230

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MOTOR 800 H.P. Westinghouse 2200/3/60 505 RPM MULTI SLIDE MACHINE No. 35 U.S. Multi-Slide, Max. Capy. 4¼" wide x .089

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SLITTER
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TOrrington #1734 12-Roll, Capy. 1¾", Rd. 1-9/16"
¾" Shuster Straightener, 12 Ft. Cut-off

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#4 Torrington 2-Die, Capy. 2" Tube. ¾" Solid
#6A Fenn, Capy. 3¾" Tube, 1½" Solid, 10" Die
Length, With Hydraulte Feed
TESTING MACHINES
20,000 lb. Baidwin Univ. Hydraulte
60,000 lb. Southwark-Emery Universal Hydraulte
100,000 lb. Olien Universal Beam Type
500,000 lb. Olien Universal Beam Type
500,000 lb. Olien Universal Beam
Type
THREAD ROLLER
#60 Waterbury Farrel, Max. thread dia. 1"
THREA REDUCERS

#60 Waterbury Farrel, Max. thread dia. 1"
TUBE REDUCERS
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6 spindle Model Mi613 Pratt & Whitney In Line
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6 spindle W. F. & John Barnes Vertical Drilling
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20 Tons (2-	10 T. Trolleys)	Shepard Niles	98' 10"	27'	
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1	2000	G.E.	450	132/265	4160/2400
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2	1250	Whse.	720	600	4160/2400
1	1250	G.E.	450	250	4160/2400
2	1000	Whse.	720	600	4160/2400
2 2 2 1 3 1*	500	Whae.	1200	125/250	4000/2300
1	450	Whse.	900	280/300	2300
3	300	Whse.	1200	125/250	4000/2300
1*	300	Al.Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
1	150	Whie.	1200	250	2300
1	150	G.E.		250	4600/2300
3 1 1 2	150	Rel.	1200	125	2300
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3000	3000	Whse.	Rev.	525/600	
Inn	2200	Whse.	Mill	600	92/132
gee	1500	Whse.	Rev.	525	600
100	1250	Al.Ch	Mill	600	300/600
2=0	940	8.8.	MIII	600	800/1000
0.0	700	Whee.	Mill	600	143
100	700	Whse.	Rev.	250	300/700
200	645	8.8.	Mill	300	1000
	600	Whee.	Mill	250	110/220
1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	600	Al.Ch.		600	300/600
Į.	400	G.E.	M.P.C.	270	450
i.	300	Whse.	Mill	230	300
2	275	Whae.	Q.M.660.	6 250	425/850
1	175	G.E.	C.D.175-	A 245	800/1025
1	125	Whie.	8K-184	230	575/850
1	125	Whse.	8K-190	230	450/1000
1	100	Rel.	461 - T	250	1150/1500
1	100	Whae.	SK-183	230	450/1000
1	100	G.E.	(T)-175	230	400/1200
ĺ	86	Rel.	651-T	230	575/1150
l.	80	El. Dy.	25-S	230	525/1050
t	50/6	0 Whse.	8K-131	230	500/1500
10	50	G.E.	CD-175	230	400/1200
2.0	30/4		BK-131	230	500/1300
	T.E.F	c.C.	**-Enclose	d Forced	Ventilated.
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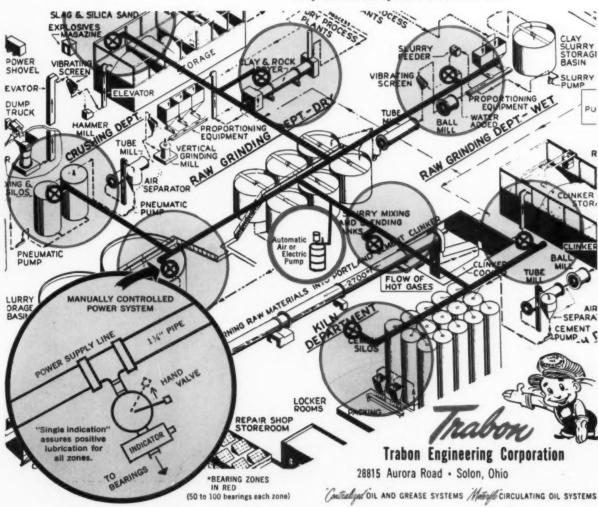
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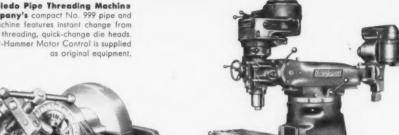
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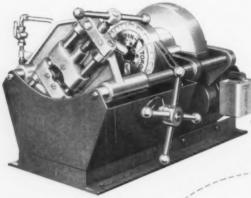
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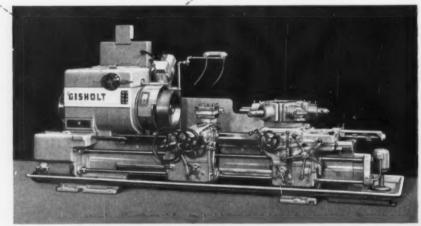
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(Continued from P. 56)



E. D. Kibble, appointed plant manager, Trenton and Gibraltar plants, McLouth Steel Corp.

The Richmond Plumbing Fixtures Div. of Rheem Mfg. Co., has appointed G. W. Beam, merchandising manager, with offices at Metuchen, N. J.

J. W. Long, named manager sales and engineering, Magnesium Alloy Products Co., Compton, Calif.; R. L. Oeffner, appointed sales engineer, magnesium sand castings; Gilbert Finch, appointed supervisor, Special Alloy Dept.



James Gillespie, named general superintendent, Trenton plant's Rolling Mill and Maintenance Div., McLouth Steel Corp.

C. Y. Cain, appointed asst. sales manager, Eastern Chemical Div., and C. W. Selover, manager, purchases, Eastern Chemical Div. of

(Continued on P. 62)

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Punches flanges and webs of beams. Full capacity loading and punching across face of ram. 150, 200 and 350 ton models.

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100-ton punch, flange-punches Ibeams in only 2 passes instead of 4 - eliminates the end-for-end turning of beams. Punches 14" hole through I" mild steel.



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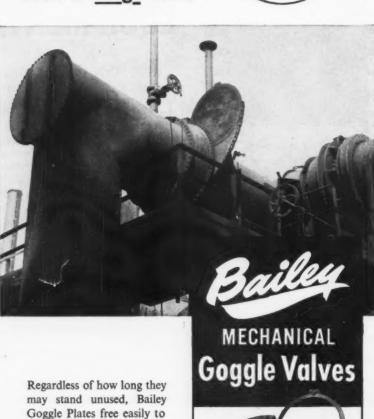


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Regardless of how long they may stand unused, Bailey Goggle Plates free easily to close or open the gas main. With goggle plates either closed or open, a powerful clamping force assures a gastight seal—dependable protection for men and equipment.





(Continued from P. 61)
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Falls, N. Y.



M. J. O'Halloran, appointed asst. general sales manager, industrial product sales, Kaiser Aluminum & Chemical Sales, Inc.

L. H. Hodges, appointed manager, Rockford, Ill., Works, J. I. Case Co., Racine, Wis.

M. A. Bresee, appointed director, Real Estate and Insurance Div., Jones & Laughlin Steel Corp.



G. R. Whitlow, named manager, export sales, Hobart Brothers Co., Troy, O.

H. L. Browne, appointed sales manager, welding products, International Div., Harnischfeger Corp., Milwaukee, Wis.

J. P. Bunce, named manufacturing manager, Contract Div., Kearney & Trecker Corp., Mil-(Continued on P. 66)



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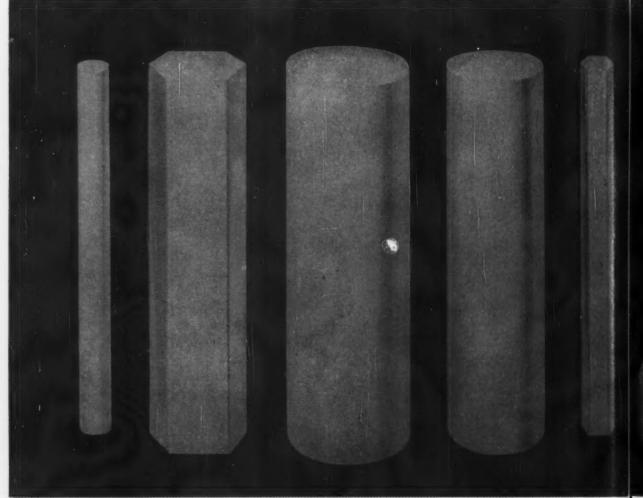
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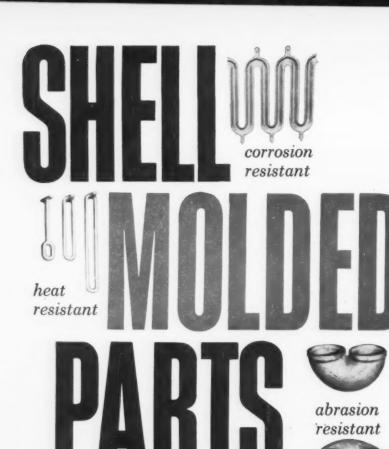
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waukee; E. H. Behrens, sales manager, Contract Div.

E. J. Byers, appointed manager, General Order Dept. at the New York plant of Joseph T. Ryerson & Son, Inc.



W. G. Bruns, named district manager, St. Louis office, Pratt & Whitney Co., Inc., West Hartford, Conn.

W. E. Johnston, appointed general sales manager, The Warren Corp., Pittsburgh.

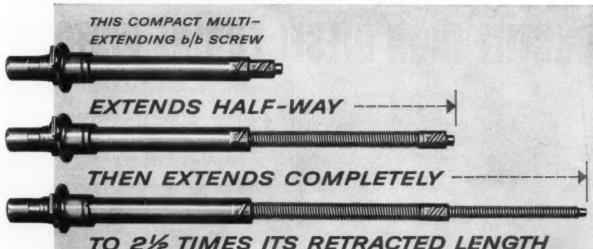
L. A. Greene, appointed purchasing manager, Aeroquip Corp.'s Jackson Division, Jackson, Mich.

Harry Tiffany, appointed head, Special Products for Sahlin Engineering Co., Birmingham, Mich.



W. T. Bennison, appointed district sales manager, Worm Gear Jack Div., Duff-Norton Co., Pittsburgh.

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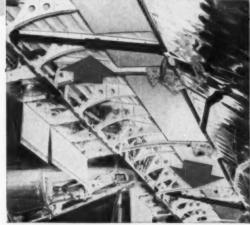


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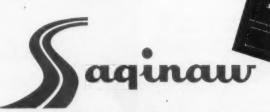
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CHATEAUGAY PIG IRON PROVES IDEAL BASE METAL FOR DUCTILE IRON DIESEL ENGINE PISTONS



Mechanical strength, wear-resistance, heat-resistance, and minimum weight are the four primary factors influencing diesel engine piston design.

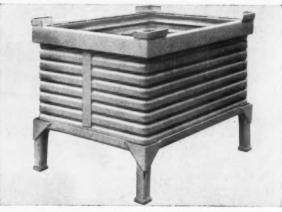
A fifth factor is cost. The piston must be designed so that it can be manufactured and sold at a reasonable price. It must be easy to cast and to machine.

Using Republic Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation has successfully met all of these requirements in developing ductile iron pistons as a replacement for aluminum. Tests, conducted under particularly severe service conditions by several major railroads, show the ductile iron pistons to have nearly double the service life of aluminum.

Chateaugay is perfectly suited for ductile iron use because of its high total carbon and unusually low phosphorus, silicon, and manganese content. Consistently uniform distribution of chemical elements in Chateaugay assists in producing a dense grain structure which results in excellent wear-resistance and economical machining.

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L-D PROCESS BASIC OXYGEN PROCESS OXYGEN STEELMAKING

Which is which—How do they differ?

L-D PROCESS in action

In the rapidly broadening use of oxygen in steelmaking, various names have been applied to differing, and even the same, oxygen steel processes.

To clarify terminology, the American Iron and Steel Institute has assigned the description BASIC OXYGEN PROCESS as the generic term for any basic steelmaking process wherein oxygen gas above atmospheric concentration is a dominant factor. The American Iron and Steel Institute definition is "The term 'basic oxygen steel' is used to define a steel which is considered to be the equivalent of basic open-hearth steel, and whose residual nitrogen content is not in excess of 0.007 per cent."

Specification writing societies including the American Society for Testing Materials and the American Petroleum Institute have applied the same terminology. The American Bureau of Shipping has also used the same general terminology with certain added qualifications.

L-D Process Explained

The L-D PROCESS, for which Kaiser Engineers is the exclusive U.S. licensor, is one of these BASIC OXYGEN PROCESSES and the one in widest use today. Of approximately 70 furnaces operating or building within this classification, 62 are the L-D PROCESS type.

(The remaining 8 are rotating vessel processes which should not be confused with the L-D PROCESS.)

L-D PROCESS is the generally accepted designation of the process where molten pig iron and scrap is subjected to high purity oxygen blown vertically onto its surface in an upright furnace.



Charging molten iron



Charging scrap



Blowing



Tapping

L-D Process Advantages

Reasons for world-wide preference of the L-D PROCESS include faster production, better product quality, adaptability to a variety of hot metal analyses, and the low capital investment of about \$13 to \$15 per annual ingot ton vs. \$18 for electric furnaces and \$33 for open-hearths.

The L-D PROCESS has also been termed "Linz-Donau" (Linz on the Danube), "Linz-Donawitz," location of the two originating steel plants in Austria and "Linzer Dusenverfahren" which has been interpreted as "Linz Jet Process." Actually, no special significance is attached today in the U. S. to the letters "L-D" other than the fact that they specifically identify, in every part of the world, the generally preferred process for adding new steel-making facilities.

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Kaiser Engineers designs and builds complete L-D PROCESS installations; also designs and builds complete steel plants including blast furnaces, openhearth and electric furnace installations, sinter plants, rolling mills, pipe mills, by-products plants, ore beneficiation, air pollution control and water treatment facilities.

For complete new-plant or expansion service, from process design to start-up day, KE offers experience coupled with traditional Kaiser ingenuity. The L-D PROCESS is an example of KE's capability in the application of new developments to the steel industry.

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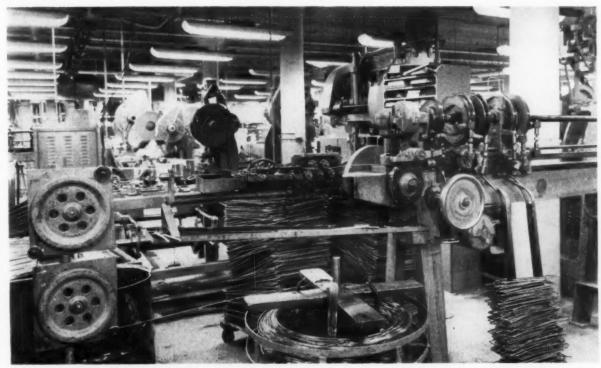


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FAST BENDING: Mechanized setup forms wire into pan rims. Tooling readily adjusts to size variations.

Integrated Design Pays Off For Job-Lot Production

A bold concept of research and development tackles modernization on three fronts: marketing, product design and production.

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It meets demands for fast output of a custom product.

 Product development can run into snags when each customer requires individual variations. This is the type of challenge offered by the bakery industry.

The product is the multiple bread-pan set. It's used in quantity, but each baker has his own specifications suited to his equipment and methods. And the rapid spread of automation has altered market needs even more.

By integrating marketing, design and production engineering, Ekco Engineering Co., a division of Ekco Products Co., Chicago, works out a successful answer. The result is custom design and job-lot production in runs of a handful to several thousand.

Flexible Design—H. W. Gillespie, president of the division, explains, "In a sense, we design bread as well as pans. We try to standardize production. But we've got to gear our product and production to

the changing requirements of the industry."

Two years of intensive engineering and research work, along with a capital expenditure of over a million dollars in new manufacturing equipment, has resulted in the new line of baking-pan sets. About 80 to 90 pct of production uses tinplate steel, but aluminum is growing in popularity for mechanized baking.

In tackling the problem, the company's goal was to add strength and rigidity to the product without adding weight. On the marketing side, engineers were well aware of



COMBINE PANS: Straps pass through projection welder in assembling of pan setups. Welder makes circular joints at special 3-D projections.

the effect of automatic equipment on bakery pans.

Check Weak Points—Thorough studies uncovered the common points of failure and the up-to-date requirements of bakers. Design then started with a list of general strength requirements. These were worked in with production needs to determine what methods would best give the desired results.

Morris Kaufman, chief engineer in charge of the project, says, "We made a complete study of what the problems were and how they could be solved. We broke the set down into components and worked on each individually and then collectively." Major elements are: pan, rim wire, strapping bandiron, and method of assembly.

Take the pan. When the sidewall flexes in service, there is movement between the wire edge and rim wire. This tends to pull in the sides of the pan.

Rough Service—Then the wire edge pulls away from the wire. Constant pounding the bread sets take is another cause of uncovered wires.

Due to manufacturing variations, there is a minute space between wire and wire edge. Pounding on the top edge flattens the rim, forces material to expand and unravel.

Engineers knew that one way to stop this was to bond the wire edge to the wire. After trying many methods they settled on welding.

The first thought was to go to seam welding. This plan had to be dropped because the tinplate could not withstand the intense overall heat.

Use Stitch Weld—An alternative was stitch welding. Working with engineers from Sciaky Bros., Inc., Chicago, they developed a high-production setup. It gives a series of individual welds equally spaced.

The stitch welder designed for the job has two top disks and a sliding table between which the work passes. This way both sides of a pan are done in one pass.

This operation must do three things: make a strong acceptable bond or weld; meet production rates; and be adjustable for size requirements.

Closes Space—While the weld is

invisible from the top edge of the pan, it will pull a nugget of parent material when tested to destruction. Also, because of pressure used in welding, the setup eliminates the space between the wire and wire edge, rolling the edge further around the wire.

Now with the wire edge held tight any pounding on top disperses in two directions. This distribution minimizes deforming of the pans.

Bonding the edge to the wire reduces flexing of the sidewall, but not enough to satisfy the standards set. The next step was to eliminate the splice and beef up the rim wire.

Strength in Butt Weld—Welding again furnished the answer. By moving the splice to the end of the pan, the engineers found they could butt weld the joint.

To insure a good weld in production, an inspection bend of test pieces to 45 deg at the joint far exceeds conditions found in use.

To strengthen the wire, an obvious answer is to boost the size. But this would add weight and defeat the primary goal. So the answer was a harder spring-tempered wire to resist deforming.

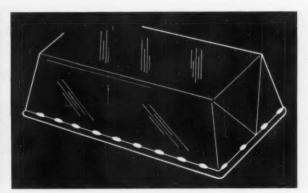
Heat Treat Helps—Because of difficulties of handling, forming and welding prehardened wire, they decided on heat treat after processing. To secure final hardness in one operation, they've chosen a special steel with a lower than normal spread of carbon content.

Another problem is the bandiron in the area where the baker's depanner bar strikes. Reinforcement can resist this pounding, but again increasing strength without adding weight is the problem.

You can't heat treat the bandiron as a unit because of distortion and assembly difficulties. So they decided on induction hardening of critical depanning areas only.

Welding for Assembly—Another point for improvement was the method of assembly. In streamlin-

DESIGN FOR STRENGTH: Change to spring-tempered rim wire (left) makes firmer pan walls. Stitch



welding underside of pan rims stops flexing (right). Pressure eliminates space between wire and edge.

ing operations by switching from riveting to welding, the problem was to find a high-production method that could handle the range of sizes, and give a weld strong enough.

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They looked at two types of welding: spot and projection. The projection method seemed best suited for this type of assembly.

Conventional shape for a projection is a dot used individually or in clusters. Size and depth of the projection is determined by materials being welded.

Add Depth—The dot projection by itself has minimum strength. So the engineers developed a stronger weld by shaping each projection in a circular segment. By using three such segments they have almost a full circle. Depth of the projections gives a third dimension.

This type weld actually has four

times the area of a dot, and similarly greater tensile strength, according to tests.

This welding concept works at the ends of the assembly, too. Instead of the former splice and clip, they moved the splice toward one corner and added another clip. These were positioned a quarter of the distance from each corner, thereby equally distributing any deforming load.

Customize Design, Production—While making available to the industry these new product features, and others—such as 45° bottom and side corrugation—the company must be prepared to make a wide variety of combinations of sizes, features and quantities.

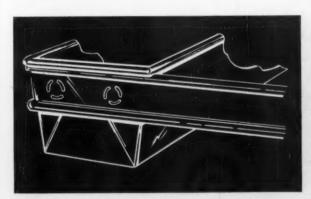
With no one standard pan set, there's any number of possible combinations of dimensions and features. The result at Ekco might be termed a production job shop. Nearly all equipment and machines are special purpose.

Speed Changes—Tooling is minimized. Much is low-cost or adjustable to speed setup and job changes. On press operations, for example, the shop uses hardwood punches and rubber pad forming.

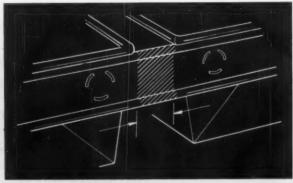
"As much as 97 pct of our tooling is changeable," says production superintendent Robert Silberman, "because of our great need for flexibility."

With the new approach, utilizing welding and other modern techniques, the company places itself in position to boost output and cut production costs.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



IMPROVE ASSEMBLY: Circular projection weld bonds pans to strap. Size and depth of projection is



determined by the materials being welded. Shading shows where strap is heat-treated in depanning area.

AM-355: High-Strength Stainless

It Links Good Corrosion Resistance With Ease of Fabrication

By G. N. Aggen, Metallurgist, Research Laboratory, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Relatively low in alloy content, this high-strength stainless can be hardened and still retain excellent corrosion resistance.

Easily forged, it can also be welded by conventional methods.

■ AM-355 stainless steel is recommended primarily for applications requiring high strength - to - weight ratios and good corrosion and oxidation resistance up to about 900°F. Relatively low in alloy content, its nominal composition calls for 15 pct Cr, 4 pct Ni, 3 pct Mo,

0.10 pct N and under 0.15 pct C. The alloy was developed by Allegheny Ludlum Steel Corp., Pittsburgh.

Produced as sheet, foil, plate, forgings, forging billets, and bars, it is electric-furnace melted in commercial heats by both Allegheny Ludlum and Universal Cyclops Steel Corp. The developers also produce commercial heats that are melted by the consumable electrode process.

Dual Role — Depending upon heat treatment, AM-355 can be made to resemble an austenitic stainless steel such as Type 301 or a hardenable stainless such as Type 410. This is possible because the alloy occupies an intermediate position with respect to austenite stability.

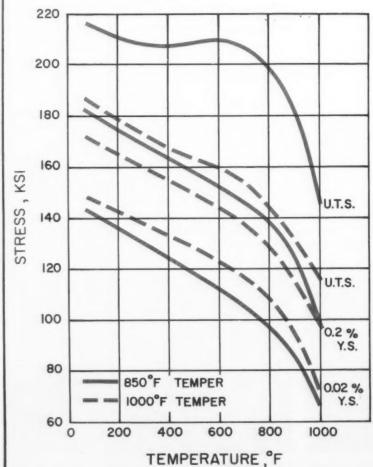
All of the elements present in the alloy contribute to austenite stability, the most effective being carbon and nitrogen. Heated to 1900°F or above, the alloy becomes a homogenous single phase with all alloying elements in solid solution. Rapidly cooled to room temperature, the elements remain in solid solution. The M_s of the alloy is well below room temperature

In this condition, the alloy can be readily cold formed. It resembles Type 301 in this respect.

Raise M_s—When reheated in the range of 1200° to 1800°F, chromium carbides are precipitated, decreasing the austenite stability of the solid solution. Holding in the range of about 1650° to 1750°F for a few minutes raises the M_s temperature slightly above room temperature.

Transformation from austenite to martensite is forced to virtual com-

FIG. I - YIELD AND ULTIMATE TENSILE STRENGTH



pletion by cooling to —100°F. The martensite may then be tempered to a desired hardness much like conventional martensitic stainless.

The high-temperature anneal is ordinarily used only in conjunction with AM-355 plate when good formability is required. In this condition, the structure is nearly completely austenitic. It may contain from 0 to 5 pct delta ferrite, depending upon the composition of the particular heat. Presence of this constituent does not appear to affect mechanical properties.

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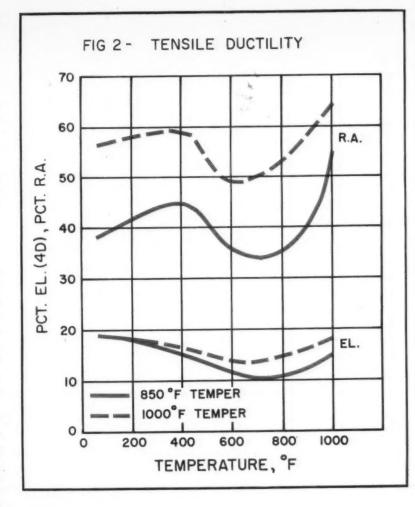
Some Austenite—After complete heat treatment (low temperature anneal, subzero cool, and temper) the structure is almost entirely martensitic. In addition to any delta ferrite present, the structure also contains retained austenite uniformly interspersed among martensite plates. The usual range of retained austenite varies from 5 to 20 pct, depending upon composition.

The residual retained austenite is stable. It does not transform to martensite upon subsequent heating and cooling. Specimens have been thermally cycled between 800° and —100°F under high stress for periods up to 21 days without effect upon the amount of retained austenite or dimensional stability.

Unless the material is to be reforged, the high temperature anneal is not recommended for bar or billet stock. This anneal produces a coarse austenitic grain not refinable by heat treatment alone. It also decreases response to subsequent hardening treatment, resulting in slightly poorer properties.

Forging Practice—In general, the alloy should be forged from a maximum of 2150°F. Prolonged exposure to temperatures above this level results in the formation of free ferrite, affecting hardening capacity to some extent. Since the alloy deforms readily at moderate temperatures, heating above 2150°F offers little advantage.

Final reductions should be per-



formed in the range of 1700-1800°F. This restricts subsequent grain coarsening tendencies and produces a homogenous precipitation of carbides.

After forging, the material can be conditioned for heat treatment in either of two ways. It may be equalized for 3 hours at 1375-1475°F, air cooled to room temperature and, if desired, overtempered for 3 hours at 1050-1100 F. Or it may be buried in vermiculite or other insulating material before

Stress	Rupture	e and (Creep I	Propert	ies	
Tomosino	Test	Ctrass	Psi, for Fr	neture In	Stress, Psi, fo	
Tempering Temp., °F		10 Hrs.	100 Hrs.	1000 Hrs.	0.00001%/Hr.	
850	700		_	_	>165,000	>180,000
1000	700	_	-	_	-	-
850	800	190,000	185,000	181,000	27,000	100,000
1000	800	140,000	138,000	135,000	-	-
850	900	145,000	122,000	102,000	-	
1000	900	110,000	105,000	100,000	_	-

temperature drops below 1550°F.

Better Heat Treating—The conditioning treatment precipitates as much carbide from solution as possible prior to heat treatment. This assures full response to heat treatment and excellent uniformity of properties from heat to heat. It also helps to compensate for variations in forging practice.

Cooling to room temperature or below results in partial transformation, principally along grain boundaries. Upon reheating, carbides are precipitated uniformly in these transformed regions, avoiding sharply localized or continuous grain boundary carbide precipitation. This favors mechanical properties and corrosion resistance.

Bars and billets of AM-355 (unless for re-forging) are shipped from the mill in the equalized condition. The recommended temperature range for austenitization prior to hardening is $1710\pm25^{\circ}F$. For bars and forgings, one hour at temperature is recommended followed by a fast cool such as water or oil quench.

In this condition, the alloy will be partially transformed to martensite. Transformation is completed by cooling at —100°F for at least 3 hours, followed by warming in air to room temperature. The material may then be tempered for 2 to 3 hours in the range of 850 to 1000°F and air cooled.

Easier Machining—Tempering at about 850°F produced hardnesses in the Rc 47-50 range. This is rather difficult to machine. The solution lies in rough machining in the equalized and over-tempered condition at a hardness of about Rc 35. Finish machining may be handled after complete heat treatment.

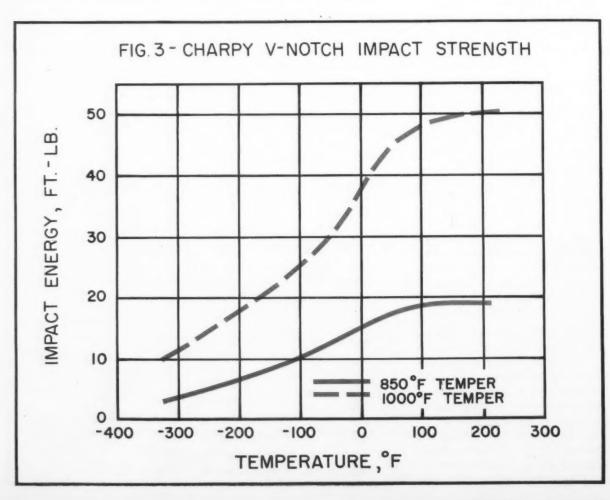
Material tempered at about 1000°F has hardnesses in the Rc 38-41 range. It is readily machined with high-speed tool steels after complete heat treatment.

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The short-time tensile properties of AM-355 are shown in Figs. 1 and 2. These are average values from several heats and represent tests from both bars and forgings.

Good Properties — Though the 0.2 pct yield and ultimate tensile strengths are substantially higher after an 850 F temper, the 0.02 pct yield strengths and proportional limits are somewhat higher at all temperatures for material tempered at 1000°F. The elongation values (Fig. 2) are similar after either tempering treatment. The reductions in area are noticeably higher after the 1000°F temper.

Charpy V-notch impact energy as a function of temperature after



both tempering treatments is shown in Fig. 3. These impact properties represent average longitudinal values for bars and billets from several heats. In both cases the impact energy varies gradually with temperature, though those of the 1000 F tempered specimens are at a much higher level.

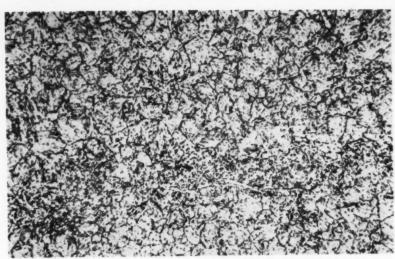
A definite transition temperature range cannot be determined either from the impact values or the appearances of the fractured specimens. This unusual behavior may be related to the residual retained austenite present after complete heat treatment.

At High Temperatures—An accompanying table describes the stress rupture and creep properties of the alloy at elevated temperatures. The curves for stress vs rupture time are nearly horizontal up to 800°F and at stress values only slightly below the short-time tensile strengths at temperature. At temperatures up to 700°F, the minimum creep rates are immeasurably low at stresses well above the short-time 0.2 pct yield strengths at temperature.

The stress-rupture strength of 1000°F tempered material is considerably lower than 850°F tempered material up to 800°F and for times to about 100 hours at 900°F. Stress-rupture strengths, however, are nearly identical at 900°F and 1000 hours and at higher temperatures.

Resists Corrosion — The general corrosion resistance of AM-355 more closely approaches that of the austenitic stainless steels than of the martensitic grades. This applies equally to material tempered at either 850 or 1000°F. Because of its molybdenum content, the alloy is superior to Type 301 in some media as, for example, a 1 pct solution of sulphuric acid.

The stress-corrosion resistance of the alloy to salt spray and salt solutions is excellent. Tests performed on material tempered at 1000°F (Rc 40) showed an immunity to stress-corrosion cracking for at



STRUCTURE: Shown at 500X, this structure is produced by austenitizing, cooling to —100°F for 3 hours, and tempering at 1000°F for 3 hours.

least 7000 hours. At the same hardness level, the material has also proved to be immune to hydrogen embrittlement cracking as measured in extremely severe solutions.

General corrosion and stress-corrosion tests have also been made on material tempered at 850° and $1000^\circ F$ in oxygenated, ammoniated, and high pH waters for nuclear power systems. After several thousand hours of testing, results were satisfactory.

How to Weld—Even when AM-355 is heat treated to high strength levels, the high temperature of welding will not result in a brittle martensitic structure in the heat affected zone or weld deposit. The hardening of the alloy is not produced by elements that are generally incompatible with welding such as copper, aluminum, or titanium. These factors account for a much better resistance to weld cracking than other hardenable stainless and high temperature alloys.

Cleaning, joint preparation, joint fit-up, and jigging procedures recommended for AM-355 are the same as those used for austenitic stainless steels. On multipass welds, interpass brushing and spot grinding — where necessary — are recommended in the interests of

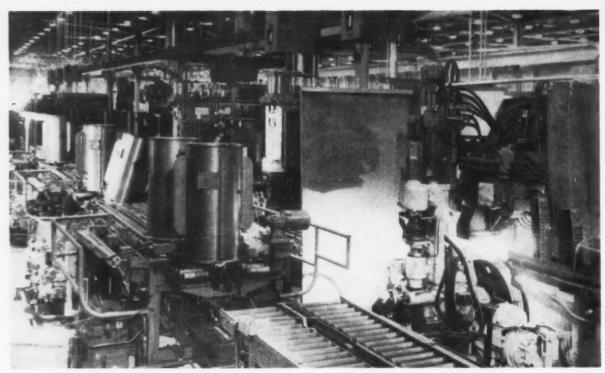
good welding technique.

The alloy can be welded in the high-temperature annealed, equalized and overtempered (1425° and 1050°F) or fully hardened conditions (1000°F temper). Preheat, control of interpass temperature and post-weld annealing treatments are not needed to successfully weld highly restrained joints.

Butt welds have been made on annealed, highly restrained plate material from ½ to 1 in. thick. Dye penetrant, radiographic, and destructive tests have not shown any evidence of base metal or weld metal cracking. Circular groove restrained weld tests have been successfully made on 0.4 to 0.8 in. annealed plate using AM-355 wire in the tungsten inert-gas process.

No Cracking—Several cruciform weld restraint tests have been made on fully hardened AM-355 using Type 308 and AM-355 coated electrodes as filler metal. Each groove was completely filled with weld metal before proceeding in sequence to the adjacent groove.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



ON THEIR OWN: Transformer tanks are moved, turned end-for-end, sent through process steps automatically.

Hands-Off Theme Keynotes New Transformer Plant

Usually, the line is designed to suit the product.

In this case, the product was changed to obtain near-automatic manufacture.

• A complete distribution transformer every two minutes: this is the output achieved by Westinghouse Electric Corp. in its new plant at Athens, Ga.

Highly mechanized production and materials-handling equipment make it possible. And modern quality control techniques assure a highquality, uniform product.

To minimize manual handling, the plant uses almost five miles of materials-handling equipment of various kinds. These include in-floor tow lines, overhead monoveyors, power - and - free conveyors, and many special racks, trucks, and transfer devices.

While the new plant was still in the planning stage, design and manufacturing engineers worked out a major redesign of the transformer core and coil. In addition to simplifying production, the new core and coil offers improved performance.

Moves Straight Through — The entire plant is laid out for straight-through flow of materials from receiving to shipping floor.

The receiving floor is arranged so that all materials used in each feeder section are stored at the head of this section. Incoming material proceeds in a straight-through flow from the incoming carrier through the receiving floor, into and through the manufacturing feeder section and on to other feeders or to final assembly.

Flow through the three major feeder areas—tank and core fabrication, and coil manufacture—results in finished tanks, cores, and coils. Then, using a special power-and-free overhead conveyor system, these components are transported in the proper sequence and timing into a humidity-controlled room for final assembly. The assembly steps include core-coil assembly, tanking, evacuating and coil filling, then the finished transformer moves to tests, final paint touch-up, and crating.

Most test stations have automatic or semiautomatic equipment to sequence and control tests and to record test data, eliminating human error.

Applies Plastic Coating—One of the newest uses of plastics is the plastic coating given the steel transformer covers and cover bolts. The coating insulates high-voltage bushings from the grounded steel tank, preventing squirrels and other small animals from shorting out the line.

Parts are first washed, dried, and given a prime dip coating to prevent rust, and assure good adhesion. Then they're heated and placed on an automatic dipping arm over the tank that fluidizes the plastic powder.

The arm dips and oscillates the part in the suspended fluidized powder for several seconds, then withdraws it. Excess powder is blown off with compressed air; then the part passes through a post-heat oven, which completes flowout of the plastic.

Coating thickness depends on the temperatures of the part and cycle time. The coating on transformer covers gives a dielectric strength of about 12,000 v.

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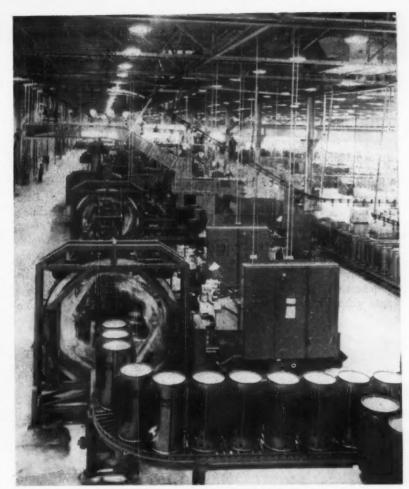
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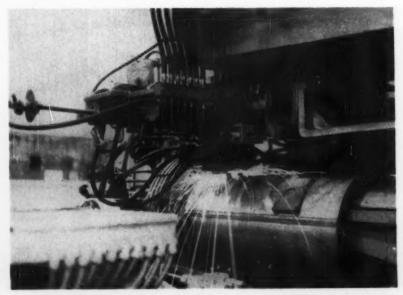
Two Conveyor Systems — The new plant's conveyor lines include about 1700 ft of power-and-free conveyors, 24 automatic switches, 5 powered elevators, 14 special lift devices, an automatic test wheel, and several hundred carriers.

There are two basic power-and-free conveyor systems made up of 11 separate conveyors. They deliver major transformer components to the first assembly operations, then carry the core-coil assembly through all of final assembly and test to the crating and shipping area. This conveyor system is the backbone of a new approach to transformer assembly based on the continuous assembly-line principles; it uses scheduled and matched components, and paced moving assembly lines with forced feeds.

The single-story plant has more than 560,000 sq ft of manufacturing area. A two-story attached office building has an additional 58,500 sq ft. The new plant is located on a 240-acre tract.



FINAL FLIP: Completed tanks coming off the fabricating line are up-ended to engage hook that carries them through clean-and-paint line.



ACCURATE LOCATION: Reference hole punched in squared sheet locates tank shell automatically for each successive step in its manufacture.

High-Strength Bolts Stay Tight

Though Easy to Tighten, They Don't Work Loose

High-strength bolt advantages include easy tightening, quick replacement.

But in five years of rugged duty, a plant's bolts have needed neither.

Fasteners holding plant interior structures often take a wicked beating. Heavy machinery or moving equipment, like big cranes, pound joints without mercy. It's logical to replace such fasteners with ones which are easy to tighten, quick to replace. These are inherent advantages of high-strength bolts.

Take Bethlehem Steel Co., Bethlehem, Pa., for instance. Fastenings in its steel mill structures undergo practically never-ending punishment. Heavy bridge cranes and trolleys stop, start and move continually.

Rivets Loosen - At the com-

pany's Lehigh plant soaking pits, two 10-ton capacity cranes subject joints to severe strain. This building has a long history of outstripping its original design capacity. Addition of reinforcing steel and rivet replacement have been frequent.

Plagued with loose fasteners, engineers decided to replace the rivets with high-strength bolts. At least, they figured, when bolts give or loosen, they're easy to replace or tighten.



OUT GOES THE OLD: A worker burns heads from loose rivets; another air-hammers the rivets from holes.



NUTTING-UP: Loose rivets now burned out, a workman applies nuts to the substitute high-strength bolts.

To the engineers' pleasant surprise, in the bolts' five years of holding the structures — plus two years of holding together the cranes themselves—not a single bolt has loosened.

Bolts Hold Tight—Bethlehem researchers find that a high-strength bolt the same diameter as a rivet it replaces has half again the holding power. Connections with such bolts increase in structural strength in direct proportion to the number of bolts substituted.

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Such findings have led the steel company to use these bolts in all connections in structural members of building and equipment which are subject to rehabilitation. Bolts now hold together: crane rail splice bar connections, a 200-ton crane in openhearth pit side service, 28 joints of structurals at the soaking pits building, and the two cranes.

Other Assets — Besides holding power, another advantage of the bolts is less installation time. It's about two-thirds the time necessary for riveting, including preparation of the connection area.

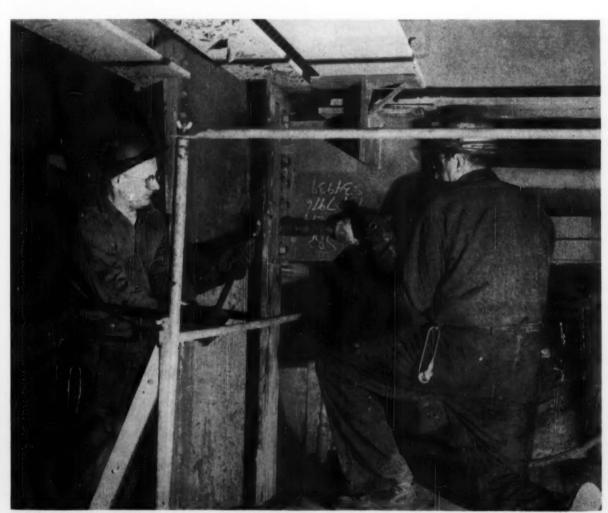
Thorough training and supervision is required for bolting-up crews. A calibrated torque wrench is used. This is practically errorproof if properly set before the day's work and kept on the job. Fewer workers are necessary; two for bolting; four for riveting.

The same crew can burn out old rivets, ream holes, fit up, insert the bolts, and do tightening. However, usual Bethlehem practice employs two crews of two men each.

How They Do It — One pair works ahead of the bolt-up men. They burn out rivets, ream, align connections and insert bolts. The bolt-up crew follows. Even in hard-to-reach locations, the company says, it far exceeds riveting. And it's safer, too.

In rehabilitating old structures, workers use a pneumatic torque wrench on bolts up to ½ in. Above this diameter, an impact wrench is used.

A supply of high-strength bolts is always kept on hand.



IN GOES THE NEW: Bolt-up crew tightens the new high-strength bolts. Workman at left holds bolt head

steady with a spud wrench. The man at right uses an air wrench to turn the nut to proper tightness.

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New Drill Setup Slashes Costs

Revamping a machining setup to cut costs doesn't always mean completely new equipment. Try weaving in some older machines, as this company did.

• Machining costs on one part toppled 81 pct when Dictaphone Corp., recently switched from gang drills to a line of multiple-spindle, high-speed drilling machines at its Bridgeport, Conn., plant.

The part is the magnesium main frame of a dictating machine. Altogether, 97 holes ranging from ½ in. to ½ in. in diam are drilled in the workpiece. Following this come

150 secondary operations—reaming, tapping, counterboring and countersinking.

Eight multiple-spindle drilling machines in the new line perform all of these operations, according to Mr. George T. Clausing, Dictaphone's manager of manufacturing engineering. They're all standard Natcos. Seven are drilling and tapping machines; the eighth is a two-way unit converted to a one-way.

Machining Sequence—Magnesium castings, about 10 x 9 x 2 in. in size, come to the machining area cleaned, heat treated and sanded to relieve stresses. The first station in

the line is a Natco H-6 where 24 holes are drilled, 2 reamed, and 4 counterbored.

Next, the frames go to a profiler and two horizontal millers which true-up faces to final dimensions. Then they start down the rest of the line

No. 2 and 3 machines between them drill 46 holes, counterbore 3 and ream 5. No. 4 and 5 machines tap a total of 51 holes and countersink 48 of them. No. 6 and 7 machines drill 27 holes, tap and countersink 8, and ream and counterbore one each.

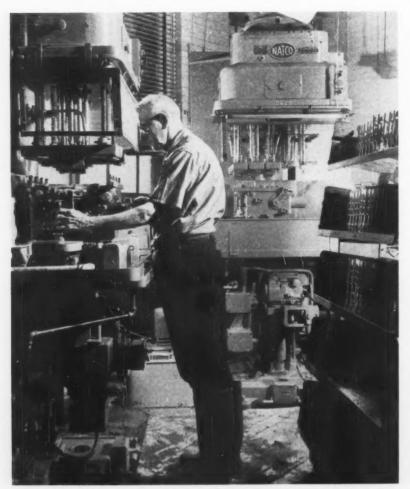
No. 8 is a retooled Natco twoway. It is set up to ream or line ream 16 holes, using only one way. The second way is available for another multiple spindle drilling head if a part change requires it.

Flexible Layout—The machines are grouped to operate either together or independently. Parts are banked at each machine, and production can be continuous or intermittent, with a single operator tending several machines in sequence. Arranged this way, the line can match variations in the company's production schedule.

Any of the eight machines can be readily shifted on the floor or retooled with ease when model changes require it. Tooling is so easily changed that the company plans to use the same line on runs of replacement parts for earlier models.

Not All New—Only three of the Natco machines are new. The other five came from other machining lines in the plant where they had been used on similar jobs, and only the tooling was changed on these.

Cost of setting up the new line came to about \$138,000. But with machining savings of more than \$1.00 per frame, and added savings in better quality control, the line will pay for itself in a hurry.



MUCH EASIER: One operator tends a group of multiple-spindle machines which drill 97 holes and perform 150 secondary operations on one part.

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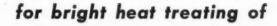
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Fuel-fired or electrically heated

Continuous Vacuum Furnaces



Beryllium, Hafnium, Tantalum, Titanium, Zirconium, High Carbon Steels, 200-300-400 and Precipitation Hardening Stainless Steels

and other strip

Again Electric Furnace Co. research scores an important break-through in heat processing. Now, fully developed and ready for commercial service, these new EF continuous vacuum furnaces offer many advantages. This continuous vacuum treatment:-

- 1) Is chemically neutral to all metallic alloys. It avoids the possibility of gas pick-up by the material being treated, thus assuring no carburizing, no nitriding and no de-carburizing.
- 2) Improves the physical properties by "outgassing" the material.
 - 3) Eliminates any hazard of explosion.

4) Drastically reduces the operating costs by eliminating the need for special atmosphere equipment.

Temperatures to 2100° F., higher if necessary. Strip can vary from .0005" to any coilable thickness, in any desired width. Furnished complete with vacuum pumps, automatic controls and terminal equipment if desired.

We will welcome an opportunity to discuss with you the advantages of this new, continuous vacuum process, and to quote on the equipment that will best meet your particular requirement.

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MOLDING PRODUCTION REPORT

What are the advantages diaphragm-head

Report on a new series of high-production, automatic Osborn molding machines. BLO-FLEX blows, squeezes and strips green sand molds within 12-seconds. Production is rapid, low-cost. Molds are harder, more accurate, more uniform. BLO-FLEX is the most recent advanced equipment development by Osborn.

AN important forward step has been made in precise quality control of molds—and their rapid production at low cost—with a new series of Osborn BLO-FLEX automatic molding machines.

mate contact between the sand and the pattern. The mold is then squeezed hydraulically to attain the desired degree of hardness—resulting in superior quality molds and superior casting finish. The entire BLO-FLEX operation is automatic

With the new BLO-FLEX, a pre-determined volume of sand is blown into the mold. The blow action assures inti-

then squeezed hydraulically to attain the desired degree of hardness—resulting in superior quality molds and superior casting finish. The entire BLO-FLEX operation is automatic and on preset time cycles. The operator simply loads and unloads flasks.

Idea Began 40 Years Ago—Foundrymen first saw the vast potential in sand blowing for forming sand to desired shapes about 40 years ago. Attempts were quickly made to

Idea Began 40 Years Ago — Foundrymen first saw the vast potential in sand blowing for forming sand to desired shapes about 40 years ago. Attempts were quickly made to relate the new core sand-blowing methods to green sand molding. But, the expected results never materialized because temperamental molding sand would not behave according to molding and casting rules.

Research Pays Off—Rather than abandon a tremendous potential—The Osborn Manufacturing Company continued application research work on sand behavior in machinery. Result of these extended engineering and development efforts is Osborn's new series of BLO-FLEX automatic molding machines—rapidly being recognized as the foundry industry's standard because of their ability to produce green sand molds faster, harder, more uniformly and at lowest cost.

Superior Quality As-Cast Finish — The Osborn BLO-FLEX blows, squeezes and strips green sand molds to meet extremely high quality standards. Resulting castings can be held to closer dimensional accuracy. The as-cast finish is outstanding. And BLO-FLEX produces molds faster than any other molding machine available today.

Unique New Blow Head — Construction of Osborn's series of BLO-FLEX molding machines is extremely simple and compact. Operation is based on a new, exclusive type blow head—developed by Osborn. The molding sand flows readily through the blow head when the blow action is initiated. The sand is distributed over the pattern in a manner that assures molds of proper uniformity, density and surface quality.

Hydraulic Squeeze Action—Although the desired blowability of green sand is achieved through the new Osborn blow head—it is the addition of hydraulic squeeze action that accounts for the simple construction and rapid BLO-FLEX operation. The BLO-FLEX machine is arranged so the vertical clamp piston rises and clamps the flask against the blow head. Molding sand under pressure is blown through the blow



BLO-FLEX Model 19-M-2 Middle-range size unit in the series—engineered to produce medium-size molds. All BLO-FLEX models operate automatically, on preset time cycles. BLO-FLEX Model 19-M Smallest of the series designed to handle production of small, superior quality molds. Mold surface characteristics are outstanding to produce excellent castings flaich.

of Osborn's new blow-fill, hydraulic-squeeze, BLO-FLEX molding machines

opening and spreader which are integral with the squeeze head. With one vertical acting piston, the mold is blown and squeezed to the desired degree of hardness. As the vertical clamp piston descends to the rest position, the mold is stripped.

Controlled Squeeze Pressure — Arrangement of the BLO-FLEX hydraulic squeeze piston allows complete control of squeeze pressure — while still allowing high-pressure molding if desired. Squeeze pressures are not subject to variations due to fluctuations in the air line supply — nor the air pressure available.

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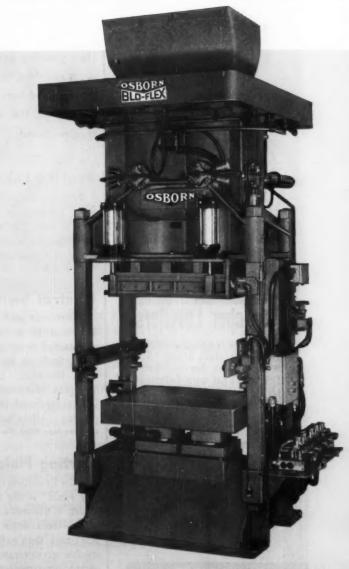
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KEY OPERATING FEATURES AND PRODUCTION ADVANTAGES OF THE NEW OSBORN BLO-FLEX

- Pneumatic Blow Fill feature produces excellent sand distribution and pre-hardness for each mold.
- Flexible Diaphragm or rigid squeeze head available—depending on requirements.
- Hydraulic Squeeze action allows a wide squeeze-pressure range—adjustable for various desired high or low pressure levels.
- Hydraulic Draw Stroke action occurs during return stroke of the squeeze piston. No separate draw mechanism required.
- No Sand Spillage because of blow-type fill.
 Exact, controlled volume of sand is blown and squeezed immediately—resulting in clean operation.
- Controlled Fill considerably increases the efficiency and useable capacity of the sand system.
- Rapid Cycle Time . . . mold production cycle is completed within 12 seconds.
- Minimum of Working Parts helps keep maintenance at an extremely low level. No shuttling, no indexing. Only major working parts are cut-off plate in the blow head and vertical piston.
- No Costly Foundations are required with the BLO-FLEX machine. Support is necessary for only the machine itself.
- Compact Construction means the BLO-FLEX requires only a minimum of floor area for operation.



BLO-FLEX—Model 29-M. This unit is designed for large mold production. Flexible diaphragm or rigid squeeze heads are available for all models.

More Details are Available—Development of the BLO-FLEX units is recognized as a genuinely outstanding molding machine advance for today's keenly competitive market. Osborn's staff of Foundry Specialists looks forward to discussing the BLO-FLEX with you. There are BLO-FLEX applications for semi-production and even jobbing foundries.

THE OSBORN MANUFACTURING COMPANY





Stretcher Levellers

Complete range of stretching capacities from 150 to 750 tons, for levelling ferrous and non-ferrous sheets in sizes up to 120" wide x 500" long.

Speeds and length of "stretch" to meet all requirements.

Adaptable for automatic cycling.

Bar Mills . Merchant Mills . Sheet and Strip Mills . Pinion Stands Roller Tables . Reduction Drives Stretcher Levellers . Roll Lathes . Guillotine Shears

Special Machinery . Sheet Mill Shears . Machine Work



New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 93.

Bearing Lube

Lubrication of miniature instrument bearings is the subject of a new manual. Properties, standards, military specifications are covered. (Miniature Precision Bearings, Inc.) For free copy circle No. 1 on postcard, p. 93

Control Switches

Instrument and control switches described in a bulletin come in maintained or spring return contact types. Switches have uses with circuit breakers, transformer tap changers, motor-operated rheostats, instruments and other electric apparatus. (Allis-Chalmers Mfg. Co.) For free copy cirlce No. 2 on postcard, p. 93

Cutting Fluid

"The Evolution of a Modern Cutting Fluid" is the title of a 4-page folder. It discusses coolant development-from water to oil to fortified bases, then to heavy-duty water soluble concentrates, and now to chemically conceived coolants containing no petroleum. (E. F. Houghton & Co.)

For free copy circle No. 3 on postcard, p. 93

Aluminum Extrusions

Design and production of heavypress aluminum extrusions is featured in a 16-page publication. It reviews facilities for making solid shapes, hollow shapes, panels and tube. A special section covers big aluminum extrusions for missiles. (Harvey Aluminum).

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For free copy circle No. 4 on postcard, p. 93

High-vacuum Pumps

Small compound high - vacuum pumps outlined in a bulletin have 2 and 3-cfm capacities. Pumping is rapid; ultimate blankoff pressure is 0.1 micron. Operation is quiet, vibrationless. (Vacuum Equipment Div., F. J. Stokes Corp.)

For free copy circle No. 5 on postcard, p. 93

Presses

Four column, single-action hydraulic presses appear in a 12-page bulletin. Presses have rugged, welded steel construction of crowns, beds and sliding platens. Specifications cover 48 models, up-acting or down-acting, in 25 to 1000-ton capacities. (K. R. Wilson, Inc.) For free copy circle No. 6 on postcard, p. 93

Flexible Coupling

A specification sheet covers a new pin and rubber cushioned bushing, low cost flexible coupling. Four sizes take 11/4, 13/4, 21/4 and 23/4-in. maximum bores. (Ajax Flexible Coupling Co., Inc.) For free copy circle No. 7 on postcard, p. 93

Anchor Stops

Anchor stops described in a brochure simply, cheaply allow indexing or positioning of drill templates or other tooling onto the work prior to fabricating operations. Stops simply press into drilled or punched holes. (Hi-Shear Rivet Tool Co.)
For free copy circle No. 8 on postcard, p. 93

Air Moving

Mechanical draft and other heavy-duty fans are subjects of a bulletin. Units range from kiln fans to cyclone compressors. Bulletin has 28-pages. (For free copy write on company letterhead to Buffalo Forge Co., Buffalo 5, N. Y.)

Gas Burners

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Gas-air burners presented in a bulletin are low-cost, precision-built. They combine positive flame geometry with high heat release and low turndown. (Selas Corp. of America).

For free copy circle No. 9 on postcard, p. 93

Control Valves

Pilot operated, new single and double solenoid control valves combine rugged construction, compact design, zero leakage and full ½ in. flow (257 CFM at 100 psig). A bulletin gives details. (Hunt Valve Co.)

For free copy circle No. 10 on postcard, p. 93

Forgings

A major British forging company's 48-page hardbound book reviews a comprehensive array of forgings. It shows forging shops which are among the world's largest. Photographs show a vast range of products made by press and hammer. (English Steel Forge & Engineering Corp., Ltd.)

For free copy circle No. 11 on postcard, p. 93

Power Drives

Friction and fluid drives are briefly reviewed in a 20-page bulletin. It's packed with engineering data, schematics, etc. on: friction clutches (mechanical, and air-actuated); power take - offs; reduction gears; fluid couplings, and torque converters (single-stage and three-stage). (Twin Disc Clutch Co.)

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ULTRASONIC "PRE-MACHINING" INSPECTION IS EASY...TAKES ONLY A FEW MINUTES... SAVES MANY DOLLARS IN WASTED MACHINING



With a Curtiss-Wright ECHOSCOPE*... and in less time than it takes the machinist in the picture to make his set up, you can locate, evaluate and mark any internal defects in the material.

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Whether your nondestructive testing problem involves raw material inspection, "in process" quality control or fully automated production line "go-no-go" checking, Curtiss-Wright has the equipment to fit the task and the engineering experience to help you establish inspection procedures.

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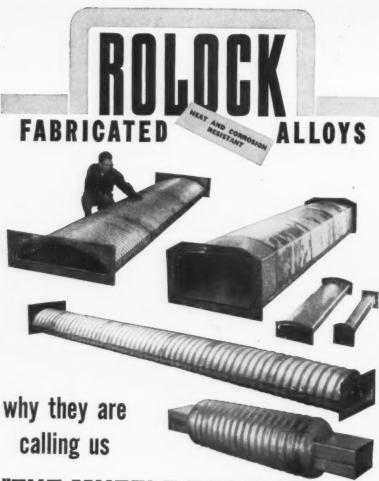
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In many years, there have been few occasions when Rolock engineers and constructors were not working on muffles . . . of almost every size and type . . . from "little fellows" to real giants.

Today, this background of experience brings us many of the most important jobs in the field, some examples of which are shown above. Among many important design contributions we have made is an entirely new type of Rolock corrugated wall and roof construction that greatly extends muffle life expectancy. To a number of muffle users Rolock's experts are, indeed, the "muffle people."

Building such muffles is a jcb that requires experienced engineering design as well as exceptional skills and craftsmanship in handling special alloy fabrication. Rolock offers you both these essentials. A constantly growing file of successful case histories shows important long-range savings to the muffle user. Let us quote on your next job . . . whether it's a standard replacement or one presenting problems to be solved.

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Rolock maintains a prompt repair and replacement service for these gas generator retorts.

Our New, improved welded-fabricated inconel retorts out perform original equipment; offer substantial savings.

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FREE LITERATURE

Motors

Integral horsepower single phase motors are covered in a bulletin. Available in ¾ to 20-hp ratings, new motors include: open protected, totally enclosed fan cooled and explosion proof frames. (Robbins & Myers, Inc.)

For free copy circle No. 13 on postcard, p. 93

Carbide Grinding

A new brochure on diamond wheels (both natural and man-made diamonds) for carbide grinding, deals with bond types, infeed and table speeds, wet grinding, diamond concentration, types of wheels. (The Carborundum Co.)

For free copy circle No. 14 on postcard, p. 93

Grinding

An 8-page bulletin gives data on time savings now possible in disk grinding. It tells about a new double horizontal spindle disk grinder. This machine makes disk grinding virt u ally automatic. (Besly-Welles Corp.)

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Automation

Building-block automation machines covered in a folder can mechanize and integrate production and assembly operations. Units include: floor feeders and orientors, rotary hoppers, self-compensating grinder controls, high speed automatic hardness testers and electronic inspection systems for multiple dimension gaging and selective segregation of parts. (Radio Corp. of America, Industrial & Automation Div.)

For free copy circle No. 16 on postcard, p. 93

Fork Truck

Operating and maintenance features a 24-v electric fork lift truck appear in a circular. Capacities run from 1000 to 2500 lbs. (Lewis Shepard Products, Inc.)

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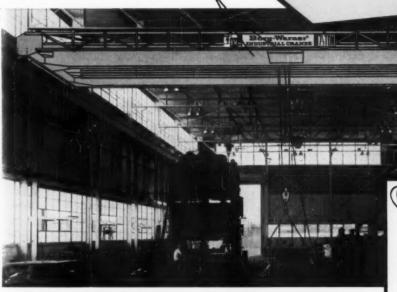
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For a 71/2-Ton, 60 Ft. Span, 3 Motor, Top-Running Double Girder Industrial Service Crane

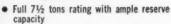


Why Borg-Warner Industrial Cranes are BETTER VALUES

Value is determined by QUALITY and PRICE . . . and, a price like this for superior Borg-Warner Industrial Cranes construction and performance assures you of top value for your materials handling investment.

If you want to boost your production and operating profits by making full use of overhead space for materials handling...if you can use the extra storage space an overhead crane will provide as compared with fork-truck stacking...if you can benefit from aisles and work areas cleared of floor-type handling equipment...it will pay you to consider a Borg-Warner top-running, motor-driven crane like this. The cost may be far less than you had imagined. One crane owner thought it would cost him nearly four times this price to duplicate his crane.

Borg-Warner Industrial Cranes offers a complete line of overhead cranes . . . for light, medium or heavy service . . . constant or intermittent service at slow, medium or high speeds . . . operation from cab or floor. Get in touch with B-W Industrial Cranes today for answers to your materials handling problems.



QUALITY

- · Heavy duty hoist
- Heavy duty steel wheels on bridge and trolley
- All welded jig bored and jig assembled end trucks
- Long life precision ball and roller bearings
- · Large gusset plates at end trucks
- Outrigger machinery girder construction
- Heavy duty gear reduction bridge drive
- Fluid coupled bridge and trolley drives
- Full magnetic push button control
- Magnetic bridge brake



The crane illustrated is a typical double girder installation. For shorter spans, smaller capacities and lighter or intermittent duty Borg-Warner Industrial Cranes can supply your needs at even lower prices.



Design it better ... Make it better.



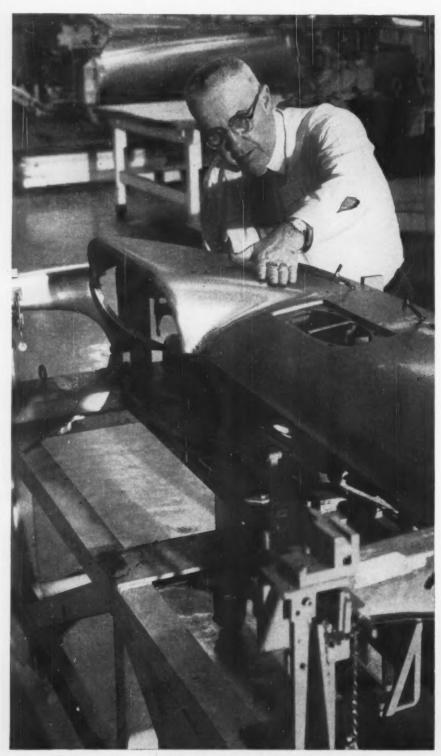
Distributors in all principal

Borg-Warner INDUSTRIAL CRANES

510 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Barg-Warner International, 36 South Wabash Ave., Chicago 3; Illinois

Auto Maker Switches to New Thomas Strip Pattern Rolled Steel for Instrument Panels



All four sections of instrument panel are tested for dimensions in checking fixture in Quality Standards Department of auto plant.

Rolled-in Calf-Skin design withstands deep draws, takes paint well.

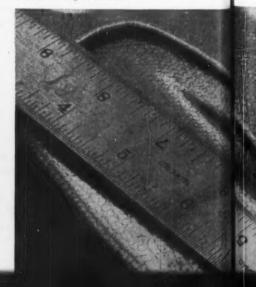
Instrument panels fabricated from Pattern Rolled Strip Steel made their debut in all 1959 models of one of the largest auto makers.

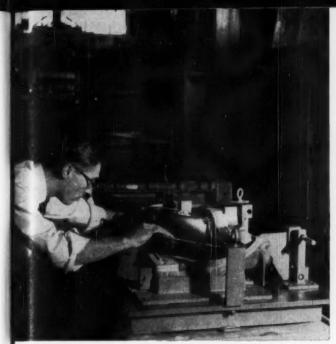
The Pattern Rolled Steel Strip is furnished the auto maker by the Thomas Strip Division of Pittsburgh Steel Co. with a leather grain. Pattern Rolled, in any design that can be drawn with pencil and paper, is available in strip and sheet widths up to 48 inches.

The auto manufacturer specifies Pattern Rolled in five widths ranging from 16 to 23½ inches in coils of steel measuring .041 inch in thickness.

• Made In Sections—Presses with up to 70,000 pounds pressure fabricate the instrument panels in four sections—upper right and left and two side panels. After painting and baking, panels are assembled in car bodies on the assembly lines. Testing

Close-up of the calf-skin grain rolled into the steel at Pittsburgh Steel Co.'s Thomas Strip Division.





In fabricating unit of large auto manufacturer, an instrument panel section is examined in checking fixture.



Instrument panel sections are painted and then assembled in the completed auto body.

on checking fixtures assures that both individual sections and complete panel assemblies are accurate dimensionally for a smooth fit during assembly.

Uniformity of hardness is another prime requirement for steady pressing operations. Surface is critical, too, because flaws would spoil the leather appearance and show through the painting job. Surface quality also plays a part in providing good adhesion between steel and paint.

Drawing quality must be tops. On the upper left instrument panel section, a corner is drawn to a depth of 4½ inches without tearing the steel or even pulling the design out of alignment. Here a correction of .001 inch in the depth of the original pattern yielded the best results. Now Thomas Strip provides coils pattern rolled to a very rigid specification on depth of pattern.

Pattern Rolled Thomas Strip is made from cold rolled steel with all the skill which Thomas has built up in more than 40 years of strip experience. Now Pattern Rolled is available in sheet widths with any pattern you desire rolled into the steel from one edge to the other and from the start of the coil right to the end.

Any fabricator whose product can gain sales appeal from improved appearance will profit by investigating the advantages of Thomas Strip's Pattern Rolled Strip or Sheet. It's available plain, or coated, in many widths with copper, brass, tin, chrome, nickel, zinc or lead alloy. Thomas Strip Pattern Rolled also can be coated with paint, enamel or lacquer on both sides or even on each side in a different color.

Whether you choose a design for product appearance or as an aid to further processing, Pattern Rolled's drawing quality, formability and surface will bring you production economies. Consult a Thomas Strip engineer on how you can use this new, modern metal. Call a Thomas man in the nearest district office.





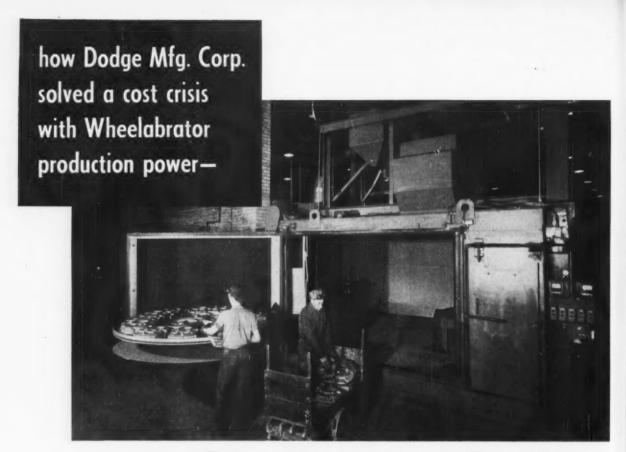
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door to cost reduction

This Wheelabrator Swing Table coped with a cost crisis in the cleaning room at Dodge Manufacturing Corp., Mishawaka, Indiana. After having modernized other departments in its large gray iron foundry, this progressive firm faced a combination of problems in its airblast cleaning operations.

Snails-pace airblast room cleaning often delayed production. Even with three operators, cleaning production could not keep pace with other departments. Overtime work was common. And, in spite of the excessive labor costs, airblast cleaning quality did not measure up to the Dodge standards of inspection.

Installation of the Wheelabrator airless abrasive blast cleaning machine, with auxiliary spot air blast

facilities, however, turned the problem into profit. The Swing Table easily handles loads-weighing up to 10,000 lbs. Easy overhead loading and unloading speeds production, makes work handling highly efficient. Mixed loads can be cleaned at one time, assuring full-time production.

The airblast room, always a dirty, uncomfortable operation, was eliminated, and with it the need to buy a new air compressor. The prodigious production power of the Wheelabrator slashed labor costs, reduced the work force one third, and entirely eliminated overtime. Cleaning quality far superior to anything previously obtained, is achieved in a fraction of the former time. Modernizing for cost reduction with Wheelabrator equipment again has paid off handsomely.



For more information, write for Bulletin 119-D. illustrating cost-saving applications of Swing Table equipment.

510 South Byrkit Street

Mishawaka, Indiana Canadian Offices: Scarborough (Toronto) - Montreal

WORLD'S LARGEST MANUFACTURERS OF AIRLESS BLAST CLEANING EQUIPMENT AND STEEL ABRASIVES

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Vinvl Finishes

Vinyl wrinkle finishes are described in a 4-page bulletin. It explains the use of vinyl plastisols, organosols and solutions in making such finishes. (Union Carbide Plastics Co.)

For free copy circle No. 21 on postcard

Steel Items

A British steel company's 32page booklet introduces a wide range of its products. Items include many finished and semi-finished steel components. Among them: 275-ton carbon and alloy steel ingots, giant forgings, castings, rolled stock, ground bars, springs, tools steels. Also shown: machining and heat treat facilities. (English Steel Corp., Ltd.)

For free copy circle No. 22 on postcard

Adjustable Drives

Wide range, adjustable diameter, wedge-belt sheaves are featured in a 4-page bulletin. All installation and mounting dimensions are listed for both adjustable diameter and companion sheaves. In addition, it briefly discusses auxiliary equipment for adjustable speed drivesadjustable motor bases and wedge belts. (The American Pulley Co.)

For free copy circle No. 23 on postcard

Tools, Fixtures

An 84-page catalog gives specifications on 2000 "standards" for tool, die, jig, and fixture design and applications. Items include an enormous line of work-holding equipment, chuck jaw blanks, handles, knobs, wheels, strap clamp assem-

blies, forged items, plus hundreds of other jig and fixture components. (Jergens Tool Specialty Co.)

For free copy circle No. 24 on pestcard

Flame Cutter

Flame shape cutting is discussed in a booklet. It includes a section on a new electronic tracing head. This automatically follows a pencil or ink drawing of the part to be cut, eliminating costly templets and reducing pattern preparation cost. (NCG Div., Chemetron Corp.)

For free copy circle No. 25 on postcard

Welding Equipment

A 24-page brochure evaluates 50 important design features found in oxy-acetylene welding and cutting equipment and industrial regulators produced by 19 leading manufacturers. (Modern Engineering Co.)

For free copy circle No. 26 on postcard

Ductile Iron

Ductile iron products for superservice conditions are presented in a 36-page catalog. Typical applications include underground piping, industrial piping, well casing, tanker piping, industrial rolls and component parts for hydraulic cylinder assemblies and industrial machinery. (American Cast Iron Pipe Co.)

For free copy circle No. 27 on postcard

Finishing Machines

Bearing - surface finishing setups for straight shafts, crankshafts and camshafts are detailed in a circular. Covered are: lapping machines, fillet-rolling machines and machines which can lap, fillet roll, or roll burnish. (The Foote-Burt Co.)

For free copy circle No. 28 on postcard

Carbide Tools

A 40-page catalog lists carbide tool products. (Willey's Carbide Tool Co.)

For free copy circle No. 29 on postcard

Conveyors

Light-duty power belt conveyors are described in two separate bulletins. One is a roller bed model:

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted.

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THE IRON AGE, April 2, 1959

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Product Manufactured

Co. Address

City Zone ... State

Company

FREE LITERATURE

the second, a slider bed one. (A. B. Farquhar Div., The Oliver Corp.)

For free copy circle No. 30 on postcard

Batch Ovens

Mechanical convection batch ovens, utility ovens, aging ovens, drawer ovens, and environmental cabinets are described in a 4-page bulletin. All feature a unique control system. (Blue M Electric Co.)

For free copy circle No. 31 on postcard

Aluminum Tube

Decorative aluminum tubing introduced in a bulletin has deep grain embossing. Patterns include: stucco, diamond, leather, square and pebble. (Kaiser Aluminum & Chemical Sales, Inc.)

For free copy circle No. 32 on postcard

Grinding Wheels

How to order grinding wheels is told in an 8-page catalog section. It explains how to choose according to abrasive, grain size, grade, structure, bond, etc. (The American Emery Wheel Works).

For free copy circle No. 33 on postcard

Foundry Addition

Steel - packaged silicon carbide addition for foundries is presented in a data sheet. This 70-pct silicon 30-pct carbon product goes into solution in molten iron similar to sugar crystals dissolving in hot coffee. (American Metallurgical Products Co., Inc.)

For free copy circle No. 34 on postcard

Cemented Carbide

Machinable cemented carbide is covered in a data sheet. (Sintercast Corp. of America).

For free copy circle No. 35 on postcard

Micro Switch

Lighted indicator and pushbutton switch devices shown in a 20page brochure are for modern panels. Parts simply snap together to form combination switch-indicator devices. Many colors are available. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 36 on postcard

New Tool Concept

Evaluating a new machine tool concept isn't easy. For this reason the developers of such a concept have published a 24-page folder to help. It suggests ways you can compare this new production idea with present methods. Shown and analyzed is a unique machine tool that challenges the common theory of "economic lot size." (Kearney & Trecker Corp.)

For free copy circle No. 37 on postcard

Power Distribution

Data on proper installation of a new primary overhead insulated distribution system is spelled out in a 20-page technical bulletin. (Rome Cable Corp.)

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Steelplant Cars

An answer to high refuse disposal costs is provided by a 6-page folder. These air dump cars handle many steelplant jobs: handling openhearth and skullcracker refuse, pit scrap, flue dust, furnace rebuild refuse, granulated slag, roll scale, powerhouse cinders, ore and limestone and plant construction material. (Magor Car Corp.)

For free copy circle No. 89 on postcard

Acid Analysis

Fluoride in acid solutions is measured via a new method. Developed by a firm checking fluoride in solutions for cleaning steel, aluminum and titanium alloys, it's covered in a data sheet. (Beckman Scientific & Process Instruments Div.)

For free copy circle No. 40 on postcard

Blast Cleaning

Tungsten carbide blades for airless abrasive blast cleaning equipment are featured in a bulletin. (Wheelabrator Corp.)

For free copy circle No. 41 on postcard

THE IRON AGE, April 2, 1989

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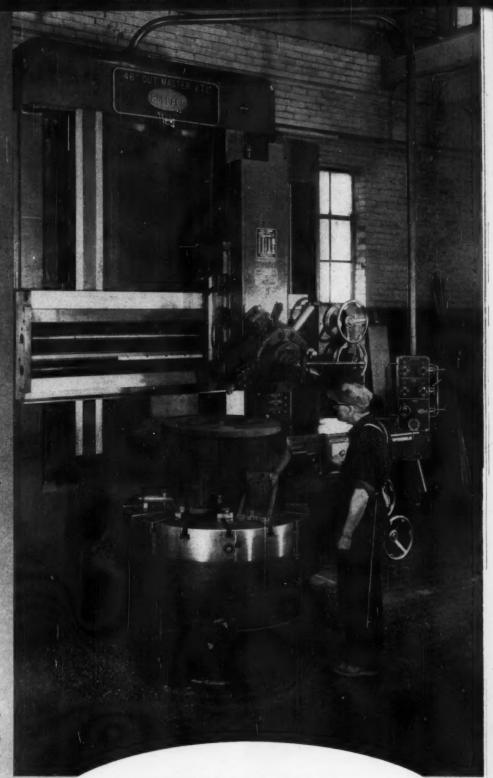
BULLARD

Cut Master V.T.L., Model 75

Extreme accuracy is mandatory for a number of machining jobs at the Fuller Company, Manheim, Pa. For example, according to Mr. M. L. Strayer, Machine Shop Supt. "the largest volume piece we process on our Cut Master, Model 75, is the facing of seats for cement diverting valves. They must be perfectly flat. This critical operation is done so accurately on the Bullard Cut Master, Model 75, that with a little hand lapping we have an airtight joint."

This machine has a 24" extra high bed, speed range 6.8 to 250.0 R.P.M. Equipped with 5 sided Turret Head and 4 sided Side Head, both hand indexing, 4 jaw hand operated chuck.

This "built-in" accuracy, which is inherent in every Bullard Cut Master V.T.L., Model 75, can be applied to your work.



CALL YOUR BULLARD SALES OFFICE OR DISTRIBUTOR FOR THE COMPLETE STORY

THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT

New Materials and Components



Compact Clutches Reduce Machine Maintenance

Virtually eliminating maintenance in machine transmissions, new magnetic clutches also reduce size of these transmissions. They provide maximum torque for their size. The stationary-field clutches can be buried in a machine drive box or transmission and forgotten; there are no air gap adjustments to be made, no slip rings and brushes to be cleaned, adjusted or replaced. The new design incorporates a

closed flux path through hardened steel laminations. It eliminates need for adjusting air gaps. Use of a stationary magnetic field — coil windings are on the stator instead of on the rotor—eliminates slip rings and brushes. Typical uses: speed-changing, feed drives, brakes and couplings in drive systems of many types of machine tools. (I-T-E Circuit Breaker Co.)

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For more data circle No. 60 on postcard, p. 93

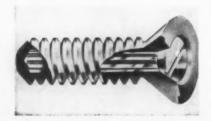


Alumina Castable Boasts Strength, Long Life

A tab-alumina castable for the 3500°F range service has exceptional crushing and rupture strengths. Long life is another key feature. Because of unusual resistance to corrosive furnace gases, extreme temperatures, newer metals, and abrasion and erosion, it drastically cuts losses due to downtime, maintenance and repairs. At

*1500°F crushing strength is 10,800 psi, at 2500°F it's 11,200 psi. Low iron content, less than 1/10 of 1 pct, make it excellent where carbon and reducing atmospheres or detrimental fuel conditions would make many castables impractical or short-lived. (J. H. France Refractories Co.)

For more data circle No. 61 on postcard, p. 93



Screw Combines Assets of Plastics and Metals

Featuring a metal core, this composite plastic screw has insulating properties of plastic, strength of metal. Further assets: shock resistance, vibration dampening and chemically inertness. The screw consists of a serrated metal core with a threaded plastics body. Its core carries torque applied by the driving means and eliminates breaking. (Austin Screw Products Co.)

For more data circle No. 62 on postcard, p. 93



Lightweight Nut Displays Strength at 800°F

Light in weight, this locknut serves in temperatures to 800°F on aircraft and missiles. The cold-forged nut is some 60 pct lighter than NAS 679 type sheet-metal nuts for these purposes. Also it's less costly since it's made of austenitic stainless, instead of expensive A-286 super alloy that's been used. It resembles a recently de-

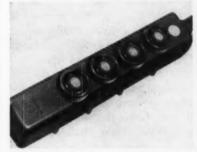
veloped nut good to 550°F. The external hexagon drive fastener meets locking torque and vibrational requirements of MIL-N-25027. Wrenching strength with a socket or box wrench exceeds this specification. It also meets envelope and mechanical requirements of proposed NAS specifications for lightweight aircraft locknuts. Pro-

duced initially in diameter sizes No. 4 through 1/2 in., sizes 7/16 and 1/2 in. may be produced later. (Standard Pressed Steel Co.)

For more data circle No. 63 on postcard, p. 93

Pushbutton Station

With a Neoprene housing, a new pendant pushbutton switch features waterproof, non-corrosive, lightweight construction. Available in 3 or 4 button models, each unit has special grommets to fit several



cable sizes, assuring 100 - pct weather-tightness. Each button is an integral part of the housing and completely encloses, by continuous design, the precision snap acting switches. (Electrical Products Div., Joy Mfg. Co.)

For more data circle No. 64 on postcard, p. 93

High-heat Valve

Continuous service in heat up to 250°F is provided by a versatile automatic valve. Hydraulically activated, the remote-control valve features a backless design. The valve disc which opens and closes the valve is an integral part of the diaphragm assembly. Maintenance is down since no lubrication or packing is required. (Automatic Valve Systems Co.)

For more data circle No. 65 on postcard, p. 93

Air Cylinders

Square end, double acting, air cylinders hold, position, move work or make fatiguing motions automatic. Available in five sizes up to 4-in. bore, the JIC cylinders handle air pressure to 250 psi, hydraulic pressure to 750 psi. Each size is obtainable with or without adjustable cushion. There are five



A NEW HIGH IN QUALITY CONTROL MEANS A NEW HIGH

in Quality Fasteners from

ALLEN

Long famous for advanced quality control techniques, Allen has expanded its Quality Control Division in its great new plant. From coil or bar stock right thru to the label on the box, each lot of Allenoy Steel is coded with its own number and checked with the finest equipment available. Furthermore, screws in process are gaged for dimensional accuracy — right at the machines.

If you want better performance made possible by the latest in manufacturing facilities, techniques and know-how, always insist on genuine Allen products.



speed assemblies.

In Cap Screws, there's no substitute for Allen Quality: 619 standard items . . . pressur-formd . . , for greater strength at vital points . . . with Class 3A threads, Class 2A above 1" dia.

Use FLAT HEADS for firm fastening with flush surfaces; No. 4 thru %" dia., lengths %" thru 2"... BUTTON HEADS for that streamlined look, without countersinking; No. 4 thru %" dia., lengths %" thru 2"... STAINLESS STEEL CAP SCREWS for corrosion and heat resistance, high tensile strength; No. 0 thru %" dia., lengths %" thru 3". For complete details, see your local Distributor, or write Allen Manufacturing Company, Hartford 1, Connecticut.

DESIGN DIGEST

available mountings: bolt; flush; leg; base: or side flush. (A. Schrader's Son Div., Scovill Mfg. Co.)

For more data circle No. 66 on postcard, p. 93

Pump Motor

A new vertical solid shaft pump motor is specifically for industrial short-coupled turbine pumps. The drive combines an electric motor, high base and adjustable coupling into one unit, manufactured, tested and delivered as a package. (U. S. Electrical Motors Inc.)

For more data circle No. 67 on postcard, p. 93

Teflon-alass Cloth

Laminated plastic is now being made from glass cloth impregnated with Teflon resin. It features low permeability and high dielectric strength. Uses include corrosive applications such as gaskets and seals and for flexible electrical insulation. It combines high tensile strength and resistance to flow of glass cloth laminates with low permeability, excellent chemical resistance and superior electrical properties of Teflon. (Continental Diamond Fibre Co.)

For more data circle No. 68 on postcard, p. 93

Variable Drive

Shaft-mounted, this mechanical variable-speed drive eliminates all intermediate transmission elements such as couplings and sprockets. This means the unit mounts directly to the drive shaft. It's for variable speed applications where space limitations dictate that the output shaft be at right angles to the transmis-



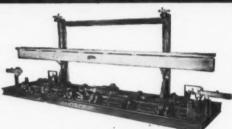
sion. It is especially adaptable to applications requiring controlled speed in a lightweight and compact power drive. Available in dripproof or totally-enclosed constructions, these 1/4 to 3-hp units feature speeds from 360 to 5.2 rpm, and speed variations from 2:1 to 10:1. (Sterling Electric Motors, Inc.) For more data circle No. 69 on postcard, p. 93

Ductile Fittings

Glassed ductile iron fittings will soon be available. The fittings are said to be 21/2 to 3 times stronger than conventional glassed gray iron fittings. Their thermal shock resistance is markedly high. Minimum (60,000-lbs) tensile strength of ductile iron is virtually unaffected by the high temperature firing em-

WEBB PRODUCTION MACHINERY

REED TRACK SUPPORTS For Automatic Welding Head Carriages



Increase production — use this fixture on 4' to 12' diameter work. Welding track is 24' to 34' long. Powered vertical adjustment is available for all models. May be used with your present turning rolls, welding positioners, special jigs for straight seam work, or portable type rolls illustrated below.

REED Portable Type TURNING ROLLS

For manual or automatic welding and other operations requirrotation of a cylindrical vessel. Capacities range from 3 tons to 75 tons; larger units built to special order. Powered by electric motor with variable speed transmission. Readily portable, they may be used free or anchored to the floor as desired.















Turning Rolls Track Supports SEE OUR BOOTH No. 917-AWS WELDING SHOW-CHICAGO



"Forgings by Finkl"

...from blueprint to finished part

This is a side cylinder for a hydraulic press. It was made from a Finkl C 1035 electric furnace steel forging weighing 32,000 pounds. When shipped it weighed 14,850 pounds. Between the start and finish it had been heat treated, milled, turned, tapped, and the inside bored and finish ground to five different specified diameters . . . and all this under one roof! The largest section is $27\frac{1}{2}$ by 44". The body diameter is 25". Overall length 11'-3".



A single source for parts such as the cylinder shown assures you of better performance and service because of greater quality control through each step of its processing.

"Forgings by Finkl" is synonymous with highest quality. Finkl custom forgings have the stamina and fatigue resistance to withstand the severe strains and torsional stresses encountered in modern heavy duty machinery. We also produce repair parts for all types of forging equipment; containers, liners, and plungers for extrusion presses; plastic molds; and die casting steels.

Next time you are thinking of forgings, think of Finkl. The best costs the least in the long run.



A. Finkl & Sons Co.

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Offices in: DETROIT • CLEVELAND • PITTSBURGH • INDIANAPOLIS • HOUSTON • ALLENTOWN • ST. PAUL COLORADO SPRINGS • SAN FRANCISCO • SEATTLE • BIRMINGHAM • KANSAS CITY • BOSTON • LOS ANGELES Warehouses in: CHICAGO • DETROIT • BOSTON • LOS ANGELES



Nameless terrors lurk in the shadows... doubly terrifying because they are unknown...

Even adults are sometimes afraid of the dark

It's only human to avoid hidden truths that could disturb us. So we worry about cancer, instead of doing something about it.

Wouldn't a checkup be more constructive? Most likely it will prove there's nothing to worry about. But please remember: Cancer can now be cured, in many cases, when detected early enough.

And one more thing ...

While you think about it, make out a check to the American Cancer Society. Your contribution is desperately needed for research that can bring this killer under complete control. For cancer will be conquered—never fear.

Guard your family...fight cancer with a checkup and a check

Send your gift to "Cancer" in care of your local post office. plo add stre

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American Cancer Society

THE

ployed in the glassing process. In addition to increased tensile strength, yield strength and thermal shock improvements, the new ductile iron fittings will bring glassedmetal construction's assets into



many new applications. Glassed ductile iron possesses similar physical and chemical characteristics to glassed steel; this includes resistance to acids except hydrofluoric at temperatures to 350°F (under specific circumstances, 450°F); resistance to most alkalies at moderate temperatures; resistance to product

adherence and easy cleanability. Fittings are 45° elbows, 90° elbows, tees, and crosses in 1½, 2, 3, 4 and 6-in. sizes. (The Pfaudler Co.)

For more data circle No. 70 on postcard, p. 93

Temperature Gage

Combining magnetic amplifier and transistor circuitry is a new indicating temperature controller. It monitors and controls temperatures within a 100 to 400°F range with extreme reliability. The device uses no electronic tubes. Typical applications: monitoring temperatures of bearings, windings of large motors and other electrical equipment, and materials in process. (Westinghouse Electric Corp.)

For more data circle No. 71 on postcard, p. 93

Protective Cloth

Consisting of aluminum sheet foil laminated on glass fabric, a new heat cloth protects personnel by reflecting radiant heat. It's flexable and easy to use as a curtain, shield

DESIGN DIGEST

or panel. As a curtain, it comes in 36-in. widths with panels buttoned together to make any length or height required. Eyelets are standard equipment on all four sides of the curtain. (Frommelt Industries).

For more data circle No. 72 on postcard, p. 93

Speed-control Valve

This control valve is a combination needle and ball-check valve. It controls speed of a single or double-acting air or hydraulic cylinder by restricting flow from the exhaust end of the cylinder during piston movement in one direction. Movement in the opposite direction unseats the ball check and bypasses the needle-valve section. The valve controls only the fluid volume. It has no effect on incoming pressure or cylinder-output force. Aluminum valve bodies withstand to 2000-psi pressures. All other parts



WAREHOUSE OPERATIONS

can be vastly improved with EUCLID CRANES



Warehouse operational efficiency is contingent in no small way upon material handling efficiency.

Euclid overhead cranes are contributing more and more to the speed up in flow of materials in and out of today's warehouses.

Floor controlled and combination floor and cab controlled cranes are available in a range of types and capacities. The steel bar warehouse pictured here relies on their "Euclid" to handle a big share of the work.

Semi-gantry cranes handle mill shipments and the various materials for the processing lines.

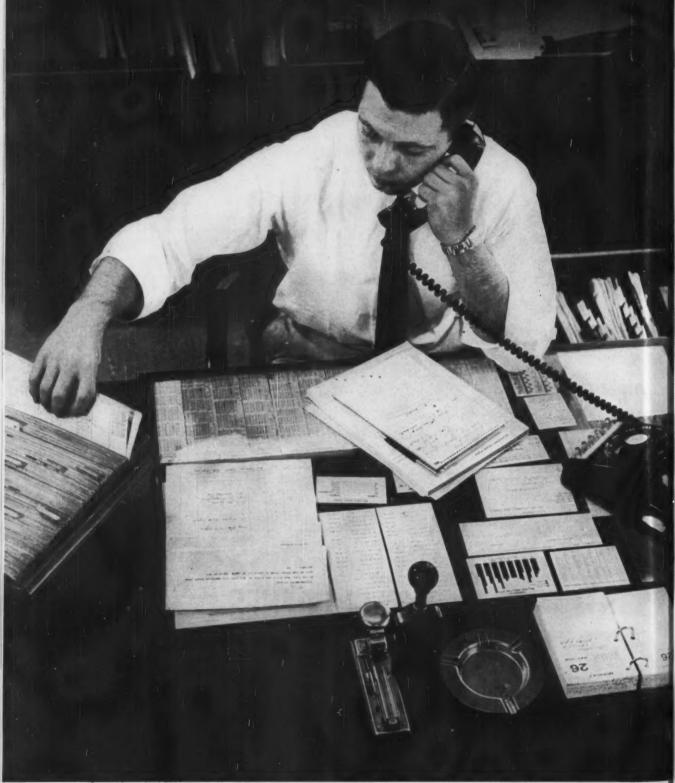
Chances are a survey by a qualified EUCLID representative may disclose an opportunity to improve your present facilities.



write TOBAY for the CATALOG

The EUCLID CRANE & HOIST CO. 1365 Chardon Rd., Cleveland 17, Ohio

integrated CRUCIBLE steel service



Ask the Crucible inside account salesman for a rundown on all the services his warehouse offers. He's your contact with completely integrated services ranging from local delivery of the steels you need to metal research.

ca

makes available a local 4-POINT SPECIALTY STEEL SERVICE

to both large and small users

All 31 warehouses offer

(1) simplified ordering

(2) in-stock deliveries

(3) metalworking assistance

(4) metal research

Each Crucible warehouse is a specialty steel service center - stocked, staffed and equipped to give you a wide range of services

Here's what the warehouse near you can offer

(1) Simplified Ordering. The inside account salesman assigned to you expedites all your orders, arranges for extra services and speeds up shipments when necessary. His personal responsibility means convenient ordering, no delays, no mistakes, nor misunderstand-

(2) In-stock delivery of 16,000 specialty steel items, cut or processed to your specifications. Because warehouses maintain these stocks at high levels, you're sure of getting immediate delivery.

(3) Metalworking assistance. Experienced service engineers will work with your engineers to solve machining, heat treating or any other metalworking

(4) Metal research. Crucible metallurgists visit local warehouses regularly. They'll bring the benefits of Crucible's experience and continuing research to your plant, too.

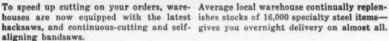
This service in depth is available because the Crucible operation is completely integrated from ore to steelmaking to warehouse delivery to you. But get full details. Ask the Crucible salesman to list all the services his warehouse offers. Crucible Steel Company of America, Dept. PD06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels









Sales-service engineers - who specialize in tool steels, stainless, alloyswill gladly help you with any type of metalworking problem.

TOOL STEELS-Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat around stocks

HIGH SPEED STEELS-Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot colled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS - Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates,

FREE MACHINING STEELS - Crucible Max-el®

rounds, hexagons, plates and brake die steel ALLOY STEELS - Bars, billets, strip and sheet COLD ROLLED CARBON SPRING STEELS DRILL STEELS - Hollow and solid drill steels ALUMINUM EXTRUSION DIE STEELS HOLLOW TOOL STEEL WELDING AND HARD FACING ROD PLASTIC MOLD STEELS

- and many others

PERMANENT MAGNETS

CRUCIBLE

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with the Backbone •

Proven On-the-Job Advantages of This Type of Gear Reduction

- No side thrusts, avoidable deflections, distortions, impact stresses.
- 2 Stronger teeth, due to archlike construction.
- 3 Greater load carrying capacity.
- 4 More silent and smoother gear action.
- 5 Uniform load across face due to balanced thrusts of opposing
- 6 Better lubrication, due to wedge action of teeth.
- 7 Overall design makes it less costly to produce.
- 8 Can be substituted for straight tooth gears.





D. O. JAMES GEAR MANUFACTURING CO. 1140 W. Monroe Street, Chicago 7, Ill.

DESIGN DIGEST

are stainless steel. The needle has an O-ring and lock nut for leak-proof trouble - free performance without frequent adjustments. Valves are available for pipe sizes from ½ to ¾ in. (Control Line Equipment).

For more data circle No. 73 on postcard, p. 93

process. It reduces molybdenum oxide at high temperatures. The developer estimates the single-stage reduction process increases molybdenum powder production by a factor of 5 to 8 times over present rates. The process may also apply with similar effectiveness to production of tungsten powder from ammonium paratungstate and tungstic oxide. (Metals & Residues, Inc.)

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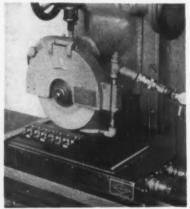
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Electrostatic Chucks

Resembling standard magnetic units, new electrostatic chucks operate on an entirely new principle. Any electrical conductor such as aluminum, copper, bronze, brass, stainless steels, magnesium, as well as ferrous metals, can be held on this type chuck with equal efficiency. Furthermore it's possible to chuck ceramics or plastics. These are first "flashed" on the holding surface with a metallic coating as little as five millionths of an inch thick. Ex-



cept for use of a dielectric, non-aqueous coolant and care in maintaining moisture - free and metal-particle-free cleanliness on holding surfaces, no special procedures are required. Work is instantly gripped and released by a simple control switch. Equipment operates on standard 110-v, 60-cycle ac single-phase current from a 3-wire grounded to deduce the circuit. (Electroforce, Inc.).

For more data circle No. 74 on postcard, p. 93

Molybdenum Powder

Molybdenum metal powder is now being made by a rapid, single-stage

NEW BOOKS

"Executive Selection: How Psychologists Can Help" is a new handbook on psychology as a management tool. It's the result of a survey by a group of students at the Graduate School of Business Administration, Harvard University. The authors' prime aim is to define the position of the psychologist and industry in the problem of finding the "right man for the job." In so doing, they cover the subject from the process of choosing a psychologist to the mechanics of reporting psychological findings to management. 127 pp. \$12.50 per copy. Management Reports, P. O. Box 136, Cambridge 38, Mass.

"Maintenance Hints" is a 24-chapter 5 x 7 in. handbook on maintenance of electrical equipment. 650 pp. \$2 per copy. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

"Creep of Engineering Materials" analyzes assets and limits of various materials which undergo creep. It unifies viewpoints of physicists and engineers. 327 pp. \$11.50 per copy. McGraw-Hill Book Co., 327 West 41st St., New York 36.

"Dendritic Crystallization" by the Russian authority on this subject, D. D. Saratovkin, is now available in a revised, considerably enlarged edition. In addition to covering general crystallization concepts, it also explores most significant views held by present-day theorists. The author contributes a good deal of new ma-

terial derived from observations under the stereoscopic microscope. 126 pp. \$6 per copy. Consultants Bureau, Inc., 227 W. 17th St., New York 11.

"Welding Type 347 Stainless Steel Piping & Tubing" was prepared under auspices of the Welding Research Council. 103 pp. American Welding Society, 33 W. 39th St., New York 18.

"The Physical Chemistry of Steel-making" presents papers of a 1956 conference at M. I. T. 257 pp. \$15 per copy. John Wiley & Sons, Inc., 440 4th Ave., New York 16.

"Tin Box Manufacture" contains 16 chapters on making seamless and built-up containers, round, rectangular and irregular. It covers "tin" making from cutting of tin plate, through fabrication, to soldering and testing finished cans. 192 pp. 89 illus. Canning Publications, 14 Coleman St., London E. C. 2, England.

"Arc Welding In Machinery Design & Manufacture" contains suggestions, check lists and guides for designing better machines. It reviews 73 typical machine designs. 224 pp. \$2 per copy (\$2.50 outside U. S.). James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

"Engineering & Technical Conventions" lists gatherings to be held for the next five years. National, regional and state technical meetings through 1964 appear. It gives date, place, sponsor groups, title or subject. Meets are also indexed by organizations and by subject matter. It's prepared by Deutsch & Shea, Inc., consultants. \$4 per copy (incl. Fall Supplement). Industrial Relations News, 230 W. 41st St., New York 36.

"Developing Executive Skills" gives current information of principles, tools and techniques of management development. 432 pp. \$9 per copy. American Management Assn., 1515 Broadway, New York 36.



"The Man from Logan" is challenged by the problem of motion every working day. Materials handling encompasses the total aspect of motion; direction, speed, and timing of materials moved over a conveying system. "The Man from Logan" is equipped to diagnose and design the exact system to fit the demanding needs of small and large users.

Behind the versatility and training of "The Man from Logan" is the company itself. For two generations the Logan Co. has been a name synonymous with quality, performance and dependability.

If you have a problem in the handling and conveying of your materials, why not talk to "The Man from Logan"? A letter or phone call will bring him to you right away.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

New Equipment and Machinery

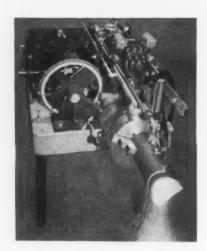


Band Machine Handles Large, Ungainly Pieces

This articulated band machine handles large or ungainly work with ease. Its cutting tool moves instead of the work. A sweeping head, double hinge and link construction provides over 99 sq ft of unlimited cutting area, and continuous straight-cut length of 17½ ft. The unit shapes and forms large parts rapidly, economically. These are machined from solid stock.

Moreover, the machine rapidly, conveniently cut-offs heavy tubing, plate, and structural shapes. The complete four-wheel variable-speed band machine has 21-in. work thickness and 60-in. throat depth capacity. It swings on anti-friction hinges to an intermediate arm, and through that arm by another set of hinges to a floor-mounted pedestal. (The DoAll Co.)

For more data circle No. 42 on postcard, p. 93



Contour Cutter Sets-Up in 15 Seconds Time

Reported to save up to 75 pct in time and material for joining pipe and fabricated parts, this automatic contour cutter practically eliminates use of forged fittings. Initial set-up takes as little as 15 seconds. Cutting at a 20-ipm rate, a 6-in. aluminum pipe can be contoured in only 20 seconds. Pipe is clamped into a three-jaw chuck and pertinent information fed into the controlling mechanism. Pushing a button activates the action and the most complex contour is auto-

matically cut without the use of templates, layouts or patterns. Sections requiring straight, mitered or contoured ends are quickly prepared with proper bevels for welding. The cutting head is equipped with an oxyacetylene torch for cutting carbon steel or a Linde Heliarc for cutting aluminum, stainless steel, copper, cast iron, magnesium, and high alloy steels. (Steffan Mfg. Corp.)

For more data circle No. 43 on postcard, p. 93



Electron Beams Perform Production Welding

For actual production work, a new setup uses concentrated energy of a focused beam of high velocity electrons to weld metals. It welds high - temperature reactive metals and super alloys and metals ranging from aluminum to zirconium. It welds tungsten, tantalum or molybdenum to each other or to other metals. A bright future is predicted for the vacuum electron

equipment in applications involving metals which react unfavorably with minute amounts of oxygen, nitrogen or hydrogen. Operation is in high vacuum. Because most impurities trapped in metal become volatile in the high operating vacuum, the entire weld zone, not just the surface, is purified. (High Vacuum Equipment Corp.)

For more data circle No. 44 on postcard, p. 93



Type 304 stainless plate, dimensions: 6%'' thick x 75" diameter. Weight, 8655 lbs.

take a look

...at the clean edges of this stainless plate accurately cut by Carlson

This stainless plate illustrates something that's almost a Carlson exclusive. Few producers can make plates of such heavy gauge, and fewer still have the long experience in flame cutting stainless to precise dimensions. To develop the proper equipment, the exact gas and iron powder formula, and the special nozzles, took Carlson engineers years of effort. But the result was worth it.

The edges achieved by these improvements reduce the cost of subsequent machining operations. And every Carlson stainless plate—whether heavy or light gauge—carries its own identification. Its chemical and physical properties are known and recorded. Its dependable performance on the job is assured.

The complete reliability of every Carlson service will materially reduce your ultimate costs. Our specialists make certain that your instructions are followed in every detail. Write, wire or phone for further information on all our services in stainless steel.

G.O. GARLSON Inc.

Stainless Steels Exclusively

120 Marshalton Road THORNDALE, PENNSYLVANIA District Sales Offices in Principal Cities



PLATES . PLATE PRODUCTS . HEADS . RINGS . CIRCLES . FLANGES . FORGINGS . BARS AND SHEETS (No. 1 Finish)

NEW EQUIPMENT

Tracer Tools

Tracer toolholders are now available to fit nearly all tracer lathes. The toolholders have a special elongated 55° diamond disposable insert. This resists pullout even when facing or machining a shoulder. The insert has flat parallel sides which fit snugly in the holder insert pock-

et. A large insert surface area provides solid clamping action, high cutting-heat dissipation rate. Car-



boloy insert grades include: 883, 78B, 350 and 370. (Metallurgical Products Dept., General Electric Co.)

For more data circle No. 45 on postcard, p. 93

Hopper Feeder

Feed speeds in excess of conventional gravity methods are obtainable with a new high-speed hopper feeder. It combines a continuous operating vane-type elevator which aligns and conveys cylindrical stock from the hopper, and a powered out-feed mechanism. Adjustable feed speed with a safety slip clutch eliminates over feeding of parts.



The out-feed mechanism conveys parts up to 20 feet from the feeder escapement to the operating machine. No adjustment is necessary to accommodate all lengths and diameter in the feeder's range. It feeds any cylindrical part or stock length bar or tube steel, copper, brass, aluminum, fiber, nylon, etc. (Clark Industries).

For more data circle No. 46 on postcard, p. 93

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Bearing Checker

A new dial indicator torque tool simplifies checking of radial friction in assembled bearings, pillow blocks, turnbuckles, eccentric bearings, etc. Design features of the tool include: (1) a large 25/8-in. OD balanced dial graduated in 12-0-12 in.-lbs, (2) a clear plastic crystal, (3) a white indicator pointer and (4) a black dial with easy-to-read aluminum graduations. Both bezel and dial can be rotated for setting zero at the rest position of the pointer before checking torque. The radial friction torque tool is 73/4-in. long, including the black holding



ABELL-HOWE

UNDERHUNG

now with

FORGED ALLOY STEEL WHEELS, GEARS and PINIONS

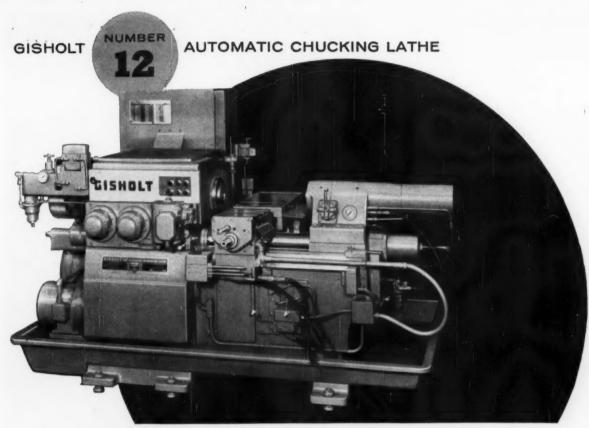
Only Abell-Howe offers you forged steel dependability at all critical points of wear—wheels, gears and pinions! Furthermore, Abell-Howe rugged outrigger construction keeps bridge in square—provides lateral bracing for bridge girder. Smooth fluid drive provides cushioned starts whatever the load—reduces reversing shocks. To further assure smooth operation and lasting service, anti-friction bearings used throughout—with double row ball bearings in end truck wheels. Here's crane value that can't be beat!





7765 W. Van Buren St., Forest Park, Illinois

BULLETIN



Unequaled in its size range, in versatility, speed and low-cost production



Whether it's for continuous operation in mass production or a wide variety of parts in small lots, this machine is in a class by itself.

Faster automatic cycle. The No. 12 is a fully automatic chucking lathe, capable of performing all types of machining operations in rapid sequence. With 420 spindle speeds ranging from 40 to 2600 r.p.m. and an infinite selection of feeds, it meets every requirement for stock removal, finish and minimum f.t.f. time.

Complete range of accessories. Front, rear, auxiliary and overhead slides can be applied; angular cuts are easily made; JETracer of single- or multiple-pass types can be used. Automation can be incorporated—from

simple loading and unloading to gaging and sorting of finished pieces.

Greater power and rigidity. Here, too, is the power (up to 40 h.p.) with rigidity to take full advantage of the newest tooling and the heaviest cuts without vibration.

Boosts operator productivity. It requires a minimum of operator skill and attention—allows him to handle additional machines.

With all its speed and ruggedness, the No. 12 has the extreme flexibility of motions to handle practically any machining job on parts up to $16 \frac{1}{2}$ " in diameter. It delivers high production with consistent accuracy and less dependence than ever on operator skill.



Ask your Gisholt Representative or write for Bulletin 1213, just off the press.



Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines
• Factory-Rebuilt Machines with New Machine Guarantee

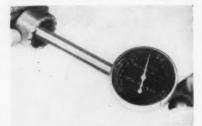
G SACHINI COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

NEW EQUIPMENT

knob. It's lightweight (7½ oz.) and compact, solidly built. Plug OD is ground to size to suit the applica-



tion, ranging from ½ to 1-in. OD. (Apco Mossberg Co.)
For more data circle No. 47 on postcard, p. 93

Turning Rolls

Turning rolls for automatic and manual welding of cylindrical vessels include two new models. These rolls, in conjunction with each other, smoothly rotate heavy wall vessels for welding or cladding. Hardfaced 30-in. OD precision ma-

chined wheels with 7-in. faces safely, accurately support over 400-ton load capacity. Four selective speed ranges provide from 4 to 80 ipm for positioning 3 to 14-ft or larger vessels. (Aronson Machine Co.)

For more data circle No. 48 on postcard, p. 93

Tracer Control

Attachments are obtainable which can turn your vertical turret lathes into contour turning machines. The electronic-hydraulic attachments automatically contour hemispherical or irregularly shaped surfaces both inside and out. They permit tolerances of ± 0.005 at 25 ipm and ± 0.0005 at speeds to 5 ipm. (Tracer Control Co.)

For more data circle No. 49 on postcard, p. 93

Ultrasonic Tester

Buy positive and negative rake Carbide Insert Tool Holders which arry the ARMSTRONG trade mark; leader in tool holders and atting tools for over sixty years.

ARMSTRONG BROS. TOOL CO. 5209 W. ARMSTRONG A CHICAGO 46, ILL.

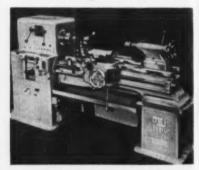
A new ultrasonic system performs bond testing and flaw detection. It permanently records test information. This makes practical ultrasonic inspection of brazed joints and adhesives bonded structures. Excellent sensitivity and definition are obtained from tests of facing sheet to core bond in brazed honeycomb. With the system, one



to one scale recordings can be made of areas 18 inches wide and of indefinite length. (Ultrasonic Testing & Research Laboratory.) For more data circle No. 50 on postcard, p. 93

Lathe

Built to an American company's specifications, this English lathe is covered by sales and service policies of domestic machine tools. Lather sizes range from 11 to 16-in.



swing. Spare parts and accessories are handled just as parts and accessories for machines made in this country. (The Clearing Div., U. S. Industries, Inc.)

For more data circle No. 51 on postcard, p. 93

Saw Blade Welder

Up to ¾-in. blade widths are rapidly joined by this bandsaw blade welder. It features a factory-set flash adjustment and a jaw clamping adjustment, tension ad-





This late model emission-type spectrograph can give direct dial readings on as many as 20 different chemical elements in testing the composition of a special steel alloy.

Latest laboratory equipment speeds quality control at Standard

Installed in the Metallurgical Laboratory at Standard Steel Works are the latest scientific testing instruments for the most accurate and rapid testing of steels in all stages of production. Samples are delivered by pneumatic tube from melting furnace to laboratory in 90 seconds. Using the spectrograph pictured above, analyses can be determined in 1½ minutes, saving hours of time over older methods.

Standard's recently installed electric furnace and vacuum degassing equipment assure delivery on special alloy products in the shortest possible time. Standard's quality control procedure guarantees that your most exacting requirements will be met. Write Dept. 1-D for details.

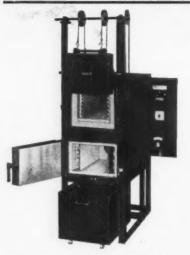
There is a specific refraction index to fluorescent X-rays for each metal, and this latest, most interesting use of them is employed to determine the composition of certain stainless and other high-alloy steels.

Standard Steel Works Division BALDWIN LIMA HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes





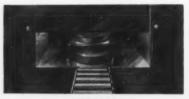
SAVE SPACE WITH A COMBINATION MODEL

The Series 8055 is two heat treating furnaces (Hardening 2,000° F. & 2,300° F., and Drawing 800° F. & 1,200° F.) in the floor space of one furnace. Each furnace is independently controlled, hardening and drawing operations can be performed at the same time. Made in 9 standard sizes or to your specifications. All operate on line voltage... no transformer needed. Hardening and preheating combinations also available. Send for free brochure.

LUCIFER FURNACES, INC.

Neshaminy 17, Penna.

Diamond 3-0411



ONLY

OLIVER-FARQUHAR

makes both conveyors and hydraulic or mechanical presses



write The Oliver Corporation
A. B. FARQUHAR DIVISION
York 23, Pennsylvania

NEW EQUIPMENT

justment and blade width indicator. Designed for manufacturing operations that require large quantities of bandsaw blades, the welder cuts



and welds any length blade. It also features a blade shear and a grinding wheel for removing flash. (Rockwell Mfg. Co.)

For more data circle No. 52 on postcard, p. 93

Cutting Wheels

Diamond cut-off wheels made by a new process' cut fully-hardened steels, silicon and germanium crystal, glass tubing, tungsten carbide,



with great accuracy. Wheels, 0.006 x 3-in., have rim tolerances of +0.0005-in., minus zero. (Navan Products Inc.)

For more data circle No. 53 on postcard, p. 93

Electrolytic Marking

An etch 0.003-in. deep in ferrous metals results in 15 seconds with a new high-potential power unit. Working from any 115-v 50 to 60-cycle ac source, it deep-etches electrolytically through special stencils. Legible marks for parts identification, trade marks, inspection code numbers and similar indicia are re-

produced permanently with production economy. It works with comparable efficiency in nonferrous and alloy materials. It takes about 5 to 15 seconds for each 0.001 in. of depth, depending on area and material. (The Lectroetch Co.)

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For more data circle No. 54 on postcard, p. 93

Small Part Pliers

Assembly jobs involving smallsized units are aided by these pliers. The precision hand tool features a unique locking arrangement. This lets its jaws firmly grip small washers, brads, screws, wires and other hard-to-handle objects. Departure



from usual plier design allows its use as a vise on operations like soldering, where both hands must be free. As a soldering vise it's an excellent heat sink. A little over 5-in. long, the plier's steel jaws are case-hardened. (Handicraft Tools, Inc., div. of X-acto, Inc.)

For more data circle No. 55 on postcard, p. 93

Jig Borers

Incorporating calibrations in the standardized International Inch is a line of new machine tools. The measurements officially become effective July 1 throughout all English-speaking countries. The machine tools include jig grinders, jig borers, and universal measuring machines. (Moore Special Tool Co.)

For more data circle No. 56 on postcard, p. 93

Rotary Grinding

A new motorized rotary table has a variable speed control (20 to 60 rmp). It has a forward and reverse switch and a clutch for hand-operating. It's designed to fit any of the following surface grinders: Reid, Brown and Sharpe, Boyer-Schultz,

Taft - Peirce, Thompson, Bridgeport and many others. The table converts a surface grinder into a rotary grinder to grind rough or precision work. It can be set up vertically for internal or external grinding. Easily installed, it needs no air; just plug it into any 110-v ac outlet. Extreme accuracy, up to 20 millionths tolerances, can be obtained on grinding a 10-in. diam plate flat. (M & M Tool & Mfg. Co.) For more data circle No. 57 on postcard, p. 93

Vacuum Metallizing

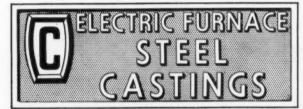
Primarily for developmental work or limited volume deposition of one or more materials under vacuum, a versatile bell-jar metallizing unit has been announced. All elements, including power supply and vibrationisolated pump, are in one compact 3 x 4-ft enameled steel cabinet. Convenient controls let the operator run the unit without moving from his station. Raising and lowering the bell-jar is almost effortless via guide rods and a planetary geartype winch. The vacuum chamber is formed by a 30½-in, high belljar and a 28-in. diam precision ground baseplate. While the unit is primarily for vacuum evaporation, it also has use as a high altitude (to 600,000 ft) environmental test chamber. In addition, it can serve as a packaged high vacuum system. It also adapts to such applications as growing single crystals, floating zone refining, low temperature drying, and leak detecting. (NRC Equipment Corp.)

For more data circle No. 58 on postcard, p. 93

Strain Gages

Strain gages especially for use on magnesium parts may be used, often in large quantities, to stress analyze aircraft and missile structures. The gages provide an extremely low coefficient of resistance—or apparent strain-when mounted on such material as magnesium (thermal expansion coefficient: 15 parts per million per 1°F). Two classes are available. One, an epoxy-black type has use at sub-zero cold to +200°F. They are ultra-flexible, very accurate. A second type, "strippable" gages, have use to 500°F. Apparent strain of these is very low to approximately 350°F; then it begins to increase. (Tatnall Measuring Systems Co.)

For more data circle No. 59 on postcard, p. 93.



are engineered to YOUR specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO. LANSDOWNE 1, PENNA.



50 CHURCH ST., DEP'T I, NEW YORK 7, N. Y.

Builders of Better Buckets Since 1888



for strength,
corrosion
resistance
and safety...
it had
to be
Stainless



This window washer anchor is fabricated from Carpenter Stainless No. 4-A (Type 304) for use with window hardware on skyscrapers in large cities. Men attach their safety belts to these anchors while washing the windows. Stainless is used for maximum corrosion resistance and strength in atmospheric conditions. In fabrication, the forging bars must flow freely without tendency to rupture. Since switching to Carpenter, the forging shop has reduced rejections because of the cleaner, defect-free surfaces. The Carpenter representative near you can supply close metallurgical cooperation and complete technical data on your stainless requirements. The Carpenter Steel Company, 121 W. Bern Street, Reading, Pa.

Carpenter |

The Carpenter Steel Company

Main Office and Mills, Reading, Pa. Alloy Tube Division, Union, N. J. Webb Wire Division, New Brunswick, N. J. Carpenter Steel of New England, Inc., Bridgeport, Conn.

The Iron Age Summary

Foreign Mills Have Field Day

Importers are busy shipping into tight American market, particularly the Midwest.

Meanwhile, steel order volume eases as consumers tie up loose ends on supply commitments.

• Foreign steel mills are having a field day in the tight American steel market. At the same time, steel importers are running into some resistance due to (1) the lateness of delivery promises, and (2) price increases in those products which are in shortest supply.

Still, it's already apparent that in the red-hot Midwestern market, foreign steel buying may hit a record high during the first half. Most of this steel is being offered for May, June, and July delivery.

German Mills Busy—A large influx of American orders is being reported by German mills, according to "German Business Weekly," published by the German-American Chamber of Commerce, Inc., New York. It says export orders in February totaled 310,000 tons, and were running at a higher rate in the first weeks of March.

Meanwhile, U. S. mills report an easing in new order volume this week. This is not due to a lack of demand, but simply an indication that steel users now know what they will get or won't get before June 30, possible steel strike deadline.

Pressure for Delivery—Some metal-working plants are not getting enough steel. They are pressing the mills for quick delivery on the ground they are using more steel than they had expected, and are in danger of running short.

This group is small, but as one producer points out, a shortage among as little as 5 pct of a customer list can create a lot of noise. The only way a mill can meet unexpected and urgent needs is by pushing someone else down the lad-

der. There is no sign that this is happening to an extent that will really hurt many people, but there is a chance of a chain reaction. If unexpected demand hits on top of lagging delivery performance there could be problems.

Railroad Demand Up—The railroad market is a good example of an unexpected and probably sustained demand. The railroads have come back late, but hard, in the steel market. It is estimated 10,000 freight cars were ordered in March. Feeling is another big carbuilding program is under way. One source estimates backlogs will hit 75,000 cars by the end of the year.

Despite the tight market, mills are doing a good job of maintaining delivery promises. Most are only a week behind on scheduled deliveries. But this will not be the case by mid-May. Then shipments are expected to lag by two-to-three weeks, and some customers may not receive shipments scheduled for the last half of June.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,661	2,642	2,562	1,312
Ingot Index				
(1947-1949=100)	165.7	163.9	159.5	81.7
Operating Rates				
Chicago	95.0	95.5*	93.0	54.0
Pittsburgh	96.0	95.0*	92.5	52.0
Philadelphia	98.0	97.0	94.0	53.0
Valley	87.5	86.0*	96.0	37.5
West	90.0	88.5*	86.0	64.0
Cleveland	96.0	96.0*	91.0	34.0
Detroit	97.0	99.0*	99.0	21.0
Buffalo	105.0	105.0	102.0	39.0
South Ohio River	90.0	95.0*	95.0	45.5
South	90.0	89.0	81.0	47.5
Upper Ohio River	97.5	98.0*	95.0	73.0
St. Louis	80.0	85.0*	89.0	70.0
Aggregate *Revised	94.0	93.0	90.5	48.6

Prices At a Glance

Week Month Year

	11112	AA GGY	MINION	rear
	Week	Ago	Ago	Ago
(Cents per Ib unless otherwise	noted)			
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	\$66.41	\$66.41	\$66.41	\$66.49
Scrap No. I hvy				
(Gross ton)	\$37.83	\$40.50	\$41.83	\$34.00
No. 2 bundles	\$25.83	\$27.83	\$30.00	\$25.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	31.50	31.50	30.00	25.00
Lead, St. Louis	11.30	11.30	10.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	103.00	102.375*	103.75	93.25
Zinc. E. St. Louis	11.00	11.00	11.00	10.00

Plating Machine Sales Are Slow

Buyers still rule the plating equipment market as an expected upturn in sales fails to materialize.

Meanwhile, a better volume of orders for chemicals and electroplating supplies keeps manufacturers' hopes alive.

• It's a buyers' market for plating equipment. The expected pick-up in orders still has not materialized. Some plating equipment makers finished 1958 in the red, and nothing so far this year has changed the color.

There has, however, been a pickup in sales of chemicals and supplies, reflecting a higher level of operations in electroplating shops. Supply business is currently the dif-

ference between profit and loss to some equipment makers. They hope it forecasts a spurt in equipment sales later on.

Automotive Slow — The slowdown in capital spending has been particularly marked with platers, and they are continuing a cautious attitude despite sales upturns.

Automotive, always one of the plating equipment industry's best customers, is recovering from 1958's poor showing. So far Detroit has shown every tendency of coasting this model year with equipment already on hand. Actually, some letdown in automotive buying was expected by equipment makers after the zooming expansion in '55 and '56. But the dip was never expected to be so deep or long-lasting. To make it worse, auto ordering traditionally slows down in

the second and third quarters, a gloomy outlook for plating machine builders.

Time to Shop — Manufacturers are reluctant to admit it, but alert purchasing agents should be able to pick up some bargains in plating equipment at present. As long as a year ago, builders were grimly promising to hold the price line as long as possible. Today, with producers desperate for business, special offers can be found.

Delivery times are at rock-bottom. Maximum delivery should now be only actual engineering and fabricating time, usually three to four months. Installation might require another 60 days. Equipment builders report raw materials plentiful, deliveries prompt.

Sales Trends — What business there is shows the trend to automatic equipment. Ironically, the higher initial cost of this equipment has probably aggravated the sales slump, as platers who are not ready for full automation are unwilling to meet the extra costs of semi-automatic equipment.

Research Attention — Another trend, now apparently firmly established, is the replacement of generators by rectifiers. In capacities up to 24 volts, and with average controls, rectifier cost is only about one-half that of generators. And more experience with both rectifiers and controls should accelerate the trend.

Platers and their equipment makers have been pushing major research projects in recent months. Pay-off date on several programs is reported very close. Special emphasis has been on improved corrosion resistance, better leveling and brighter plating.



INSPECTION POINT: Zinc die cast faucet bases are inspected after exposure to 95 ft cleaning cycle at Lee Silver Service, Inc. (Photograph from American Zinc Institute, Inc.)



"Critically needed alloys make 24-hour deliveries a must!"



Prompt deliveries from U. S. Steel Supply help keep this F-27 production line on the move!

The Fairchild F-27, first American-made turbine-powered airliner:



says Mr. V. N. Thacker, Assistant Materials Manager, Fairchild Aircraft & Missiles Division, Fairchild Engine & Airplane Corporation, Hagerstown, Maryland

"We're now producing the first American-made turbine-powered airliner—the Fairchild F-27 Propjet," says Mr. Thacker. "Naturally, during the first months of production with an all-new aircraft modifications are necessary. But despite these changes, which result in last-minute orders, U. S. Steel Supply gives us delivery of the material we need ... when we need it.

"Here's an example: We ordered 50 feet of 4130 steel, measuring 3/8" x 1", which we

needed within 24 hours. Granted, it was a small order, but it was vital to the F-27. U. S. Steel Supply delivered it in less than a day, saving many valuable man-hours."

Why not take a close look at *your* steel buying policies—you'll find U. S. Steel Supply's pamphlet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

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St. Paul, San Francisco. - General Offices: 208 South La Salle Street, Chicago 4, III.

Full Mill Books Slow Buying Stampede

With second quarter books just about filled there's less pressure on mills to accept new orders.

However, hedge buying is still expected in merchant wire products and standard pipe.

■ The frantic buying pace shows signs of slowing down.

Reason: Customers have either booked the tonnage they want or know they can't get it. As a result the number of new orders has tapered off.

This trend applies mainly to sheet, strip, bar, plate, and shapes. "It's clear demand will top supply in the second quarter," says one bar producer. "We are handling all new orders for plate on a mill inquiry basis," says an East Coast sales manager.

Auto parts suppliers are trying to move up second quarter tonnages. They want the steel now to close out production runs for the '59 models.

Some products have yet to feel the order wave—but may soon. These include merchant wire products and standard pipe.

"Our merchant wire buyers aren't stocking up—yet," says the sales manager for a large mill. "But we expect them to get in an extra carload or two before the first of July."

Pipe jobbers are another group putting off the stock buildup. But, again, they are expected to do more buying this quarter. Unless they act soon, says one pipe mill man, some of their tonnage may not get out if there's a strike. Sheet and Strip—All flat rolled products are about sold out for the next three months. Order pressure on the mills has tapered off. Most buyers have either gotten what they wanted or realized it can't be had. But some plants are coming back to the mills. They claim they underestimated second quarter needs. And they want more steel to meet inventory or production requirements.

In addition, a few buyers are placing third quarter orders. These customers want to be assured of fast delivery when a strike ends if there is one.

Some farm equipment makers, appliance manufacturers, and construction equipment companies in the **Midwest** are stepping up sheet buying from service centers. They need the sheet to meet advanced production schedules and can't get it from mills.

Galvanized Sheet—Demand for galvanized may be further tightened if automakers go ahead with plans to use it on the new small cars. One of the Big Three is considering it

PURCHASING AGENT'S CHECKLIST

American aluminum producers are after more orders from the European Common Market.

P. 21

How new fastener pricing system—introduced by Pittsburgh Screw & Bolt—will operate. P. 25

Machine tool sales stage a comeback. February orders were highest in 18 months. P. 51 for underbodies. Others are reported going to galvanized for quick rusting parts such as rocker panels.

A steelmaker in the **Detroit** area is thinking of adding another coating line in its mill. Final decision on an aluminum or zinc line has not been made.

Bar—While bar demand is trailing sheet, it remains substantial. April bookings are completed at most Pittsburgh mills. May is sold out except for a few isolated spots. June openings are still available, but are expected to be filled in a few weeks.

Hot-rolled bar mills at **Chicago** are operating at capacity and running on 60-day cycles. Some cold finishers are on a three shift, six-day-a-week basis. Delivery of special quality bar has slowed down because heat treating facilities are jammed.

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Plate and Shapes—Mills believe they have booked enough plate orders to assure capacity operations through the second quarter. Some will not handle new orders except on an inquiry basis. Warehouses are doing a substantial business in light plate.

Railroad car building and repair has taken some of the slack out of the structural market. Standard shapes are quoted for 6-8 weeks delivery by a large East Coast mill.

Service Centers—Demand from buyers is pushing sales up. Gains of 10-25 pct in March over February are reported by many distributors. Warehouses are hard pressed to keep up their stocks of sheet and bar. Some service centers have what amounts to an informal allocation on sheet orders.

Leaded Steel—U. S. Steel has opened new Bessemer leaded steel production facilities at its National Tube Division Works, Lorain, Ohio. The Corporation has produced openhearth leaded steel at the Duluth plant of its American Steel and Wire Div. for some time. The Bessemer facilities were added, USS says, to "beef up production to meet rising demand."

COMPARISON OF PRICES

(Effective March 31, 1959)

Steel prices on this page are the aver- of major producing areas: Pittsburg Youngstown.	age of vario	Gary, C	uotations Eleveland,	Mar. 31 1959 Pig Iron: (per gross ton)	Mar. 24 1959	Mar. 3 1959	Apr. 1 1958
Price advances over previous week declines appear in Italics. Mar.	1 Mar. 24	Mar. 3	Apr. 1	Foundry, del'd Phila	\$70.57 73.87 52.50 66.50	\$70.57 73.87 62.50 66.50	\$70.97 73.87 62.50 66.50
Flat-Rolled Steel: (per pound) Hot-rolled sheets	5.10¢ 5.275 6.875 5.10	1959 5.10¢ 6.275 6.875 5.10 7.425	1958 4.925¢ 6.05 6.60 4.925 7.17	Basic, del'd Philadelphia 70.07 Basic, Valley Iurnace 66.00 Malleable, Chicago 66.50 Malleable, Valley 66.50 Ferromanganese, 74-76 pct Mn, cents per lb\$ 12.25	70.07 66.00 66.50 66.50	70.07 66.00 66.50 66.50	70.47 66.00 66.50 66.50
Plate	5.30 13.55 52.00	5.30 13.55 52.00	5.12 13.15 52.00	Pig Iron Composite: (per gross ton) Pig iron	\$66.41	\$66.41	\$66.49
Tin and Terneplate: (per base box) Tinplate (1.50 lb.) cokes \$10.65 Tin plates, electro (0.50 lb.) 9.35 Special coated mfg. ternes 9.90	\$10.65 9.36 9.90	\$10.65 9.35 9.90	\$10.30 9.00 9.55	Scrap: (per gross ton) No. 1 steel, Pittsburgh \$\sqrt{4}1.50\$ No. 1 steel, Phila. area 35.50 No. 1 steel, Chicago 36.50	\$43.50 37.50 40.50	\$45.50 38.50 41.50	\$34.50 38.00 29.50
Bars and Shapes: (per pound) 6.671 Merchant bar 5.672 Cold finished bar 7.65 Alloy bars 6.724 Structural shapes 5.50 Stainless bars (No. 302) 46.75 Wrought iron bars 14.90	7.65	5.675¢ 7.65 6.725 5.50 45.00	5.425¢ 7.30 6.475 5.275 45.00 14.45	No. 1 bundles, Detroit 32.50 Low phos., Youngatown \$3.50 No. 1 mach'y cast, Pittsburgh \$9.50 No. 1 mach'y cast, Phila 49.50 No. 1 mach'y cast, Chicago 54.50 Steel Scrap Composite: (per gross ton)	34.50 44.50 50.50 49.50 54.50	38.50 48.50 51.50 49.50 56.50	24.50 34.50 51.50 49.50 46.50
Wire: (per pound) Bright wire 8.006		8.00∉	7.65¢	No. 1 hvy. melting scrap\$37.83 No. 2 bundles 25.83	\$40.50 27.83	\$41.83 30.00	\$34.00 25.17
Rails: (per 100 lb.) Heavy rails	\$5.75 6.725	\$5.75 6.725	\$5.525 6.50	Coke, Connellaville: (per net ton at ove Furnace coke, prompt\$14.50-15.50 \$14 Foundry coke, prompt 18.50	n) .50-15.50 (18.50		50 \$15.38 17.50-19
Semifinished Steel: (per net ton) Rerolling billets	\$80.00 86.00 99.58 119.00	\$80.00 80.00 99.50 119.00	\$77.50 77.50 96.00 114.00	Nonferrous Metals: (cents per pound to Copper, electrolytic, Conn. 31.50 Copper, Lake, Conn. 31.50 Tin, Straits, N. 103.004 Zinc, East St. Louis 11.00	81.50 81.50 102.375*	30.00 30.00	25.00 25.00 93.25 10.00
Wire Reds and Skelp: (per pound) Wire rods	6.40¢ 5.05	6.40¢ 5.05	6.15¢ 4.875	Lead, St. Louis 11.30 Aluminum, virgin ingot 26.80 Nickel, electrolytic 74.00	11.30 26.80 74.00	10.80 26.80 74.00	12.80 28.10 74.00 36.00
Finished Steel Composite: (per pound) Base price	é 6.196¢	6.196#	8.967¢	Magnesium, ingot	36.00 29.50	36.00 29.50	29.50

Dinishad	6742	Composite

Weighted index based on steel bars, shapes, plates, wire, ralls, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Factory Lists Touch Off Price Break

Large tonnages of industrial scrap are flooding several major markets.

The mills are buying sparingly and at lower prices. Dealer scrap goes begging.

■ End-of-the-month sales of industrial lists at generally lower prices add substance to what dealers have feared for many weeks. The steel mills may really be trying to coast through until summer on as little scrap as possible.

Factory bundles are off \$3 in Pittsburgh and as much as \$5 in Cleveland, the Valley, and Cincinnati. In Chicago, month-end industrial lists sold for \$4 under last month.

Even with the lower prices, the mills are taking reduced tonnages of choice industrial scrap.

Reports circulating in Chicago that a major mill would buy little scrap before July has touched off a mild panic in that district.

There are varying degrees of dealer reaction to mill indifference. A few dealers are determined not to sell their material at the lower prices. Others, getting panicky, appear willing to sell at substantially lower prices. Still others talk of closing down their yards temporarily until the mills come back into the market.

The only bright spot in the market is cast iron. Foundries are buying liberally and cast scrap prices are holding firm in most areas.

The IRON AGE No. 1 heavy melting Composite Price fell \$2.67 to \$37.83, based on a \$2 drop in both Pittsburgh and Philadelphia, and a \$4 drop in Chicago.

Pittsburgh — Scrap prices broke sharply downward under the weight of heavy industrial and railroad tonnages. Railroads are making much larger scrap offerings this month. Auto tonnages continue high. These facts, coupled with a lack of mill demand, brought general price weakness. No. 1 heavy melting and No. 2 bundles dropped \$2. Most other grades dropped at least \$1. Early this week, brokers were turning down mill offers to buy No. 1 heavy melting at \$40.

Chicago—Prices sagged last week when factory bundles moved down \$3 on a tonnage sale. This week, a large mill dropped its industrial scrap prices another \$1. The break spread to the entire list at reports that the mill would buy little scrap before July.

Philadelphia—No. 2 bundles are down \$1 and other openhearth grades down \$2 on basis of small purchases by a district mill. Cast is steady, but otherwise the market is gloomy. There is talk that some yards, loaded with inventory, may close down until the mills resume buying.

New York—Prices for No. 1 and No. 2 heavy melting fell \$2 a ton in view of consumer disinterest. No. 2 bundles are unchanged as yet, but buyers are choosy and little is moving. Turnings are so far holding past low levels. Some dealers fear lower cast prices.

Detroit — A fast drop in the industrial scrap market left the dealer market in an unsettled condition. No. 1 industrial bundles fell to about \$39 on lists which closed at the end of last week—off \$6 from the previous month. Remaining lists due to close this week will indicate whether the bottom was reached or if a further readjustment is in order.

Cleveland — Market settled another \$1 as a Valley mill was able to buy No. 2 bundles for \$27 and auto lists sold for almost \$3 under a month ago. Continued lack of orders for prime grades has wilted dealer markets.

St. Louis — Slow mill demand again depressed scrap prices in this area. Primary and secondary openhearth grades are off \$1. Turnings and cast iron borings are down \$2.

Birmingham — Scrap sales continue slow. Prices are soft and dealers appear anxious to sell at even lower prices.

Cincinnati—Market is off \$2 on prime grades and \$1 on secondary grades, mostly in sympathy with other areas. Local mills are expected to take reduced tonnages for the month.

Buffalo — A sharp price drop shook this market. Prices on all items except cast are off between \$1 and \$5. Primary openhearth grades dropped \$5. Sales of cast iron are reported at quoted prices.

Boston—Lower prices in adjacent districts depressed prices of openhearth scrap \$1 although no sizable sales have been made.

West Coast—Weakness in Eastern prices has taken some of the zip out of the market in this district. No. 2 bundles are soft in Los Angeles. Few dealers expect higher prices this week.

Houston—Prices of No. 1 and No. 2 heavy melting are down \$2 a ton as the district mill came into the market with an order for April.

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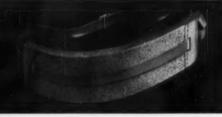
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Pittsburgh

No. 1 hvy. melting\$41.6	00 to	\$42.00
	00 to	
No. 1 dealer bundles 42.6	ot of	43.00
No. 1 factory bundles 46.6	10 to	47.00
No. 2 bundles 28.0	10 to	29.00
No. 1 busheling 42.6	H to	43.00
Machine shop turn 22.0	10 to	23.00
Shoveling turnings 27.0	10 to	28.00
	10 to	28.00
Low phos. punch'gs plate. 46.6	00 to	47.00
	10 to	34.00
No. 1 RR hvy. melting 44.0	00 to	45,00
	00 to	54.00
	of to	57.00
	10 to	50,00
	01 to	50,00
Cupola cast 45.0	of to	46.00
	10 to	44.00
Stainless		
18-8 bundles and solids, 230,0	10 to	235.00
18-8 turnings120.0		
430 bundles and solids130.0		
410 turnings 55,0	of to	60.00

Chicago

No. 1 hvy. melting	36.00	to	\$37.00
No. 2 hvy. melting	32.00	to	33,00
No. 1 dealer bundles	37.00	to	38.00
No. 1 factory bundles	40,00		
No. 2 bundles	25.00	to	
No. 1 busheling	36.00	to	37.00
Machine shop turn	18.00	to	
Mixed bor: and turn	20.00	to	21.00
Shoveling turnings	20.00	to	21.00
Cast iron borings	20,00	to	21.00
Low phos. forge crops	48.00	10	49.00
Low phos. punch'gs plate,			
¼ in. and heavier	47.00	to	48,00
Low phos. 2 ft and under.	45.00	to	46.00
No. 1 RR hvy. melting	42.00	to	43,00
Scrap rails, random lgth	48.00	to	49,00
Rerolling rails	60.00	to	61.00
Rails 2 ft and under	56.00	to	57.00
Angles and splice bars	51.00	to	52.00
RR steel car axles	68.00	to	69.00
RR couplers and knuckles	49.00	to	50.00
No. 1 machinery cast	54.00	to	55,00
Cupola cast	47.00	to	48.00
Cast iron wheels	41.00	to	42.00
Malleable	55,00		56.00
Stove plate	44.00	to	45.00
Steel car wheels	47.00	to	48.00
Stainless			
18-8 bundles and solids.2	20.00	to	225.00
18-8 turnings			
430 bundles and solids1	15.00	to	120.00
430 turnings	55,00	to	60,00

Philadelphia Area

i iniaacipina Aica			
No. 1 hvy. melting	\$35,00	to	\$36,00
No. 2 hvy. melting	29.00		
No. 1 dealer bundles	38.00	to	39.00
No. 2 bundles	23.00	10	24.00
No. 1 busheling	37.00	to	38.00
Machine shop turn	20,00		
Mixed bor, short turn	20.00		
Cast iron borings	20.00		
Shoveling turnings	24.00	to	
Clean cast. chem. borings.	30.00		
Low phos. 5 ft and under.	42.00		43.00
Low phos. 2 ft punch'gs	43,00	to	44.00
Elec. furnace bundles	40.00	to	41.00
Heavy turnings	34.00	to	35.00
RR specialties	42.00	to	43.00
Rails 18 in. and under	59,00	10	60,00
Cupola cast	40.00	to	41.00
Heavy breakable cast	42.00		43.00
Cast iron car wheels	44.00		
Malleable	67.00		
No. 1 machinery cast	49,00		50.00

Cincinnati

Brokers buying prices per gross ton	on cars:
No. 1 hvy. melting \$34.50	to \$35.50
No. 2 hvy. melting 30.50	to 31.50
No. 1 dealer bundles 34.50	to 35.50
No. 2 bundles 22.00	to 23.00
Machine shop turn, 15.00	to 16.00
Shoveling turnings 18.00	
Cast iron borings 17.00	
Low phos. 18 in. and under 44.00	
Rails, random length 49.00	
Rails, 18 in. and under 54.00	to 55,00
No. 1 cupola cast 43.00	to 44.00
Hvy. breakable cast 40.00	to 41.00
Drop broken cast 48.00	to 49.00

Youngstown

No.	1	hvy.	mel	ting							. 4	42.00	to	\$43.00
No.	2	hvy.	mel	ting								33.00	to	34.00
No.	1	deal	er b	undle	38			6				42.00	to	43.00
No.	2	bune	iles							8		27.00	to	28.00
Mac	hi	ne sl	qor	turn.			*			*		22.00	to	23.00
Sho	ve	ling	turi	nings		8	*	8	×	6		22.00	to	23.00
1.038	7 1	nhas	nla	to at								42 00	Acre.	44 00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	38.50	to	\$39.50
No. 2 hvy. melting	31.50	to	32.50
No. 1 dealer bundles	38.50	to	39.50
No. 1 factory bundles	43.50	to	44.50
No. 2 bundles	24.50		
No. 1 busheling	38.50		
Machine shop turn	17.00		18.00
Mixed bor, and turn,	22.00	to	23.00
Shoveling turnings	22.00		23.00
Cast iron borings	22.00		23.00
Cut structural & plates, 2	MMILLO	20	=0100
ft & under	44.00	10	45.00
Drop forge flashings	38.50		39.50
Low phos. punch'gs plate.	40.50		41.50
Foundry steel, 2 ft & under	39.00		40.00
No. 1 RR hvy. melting	44.00		45.00
Rails 2 ft and under	58.00		59,00
Rails 18 in. and under	59.00		60.00
Steel axle turnings	26.00		27.00
Railroad cast	53.00		54.00
No. 1 machinery cast	51.00		52.00
Stove plate	48.00		49.00
Malleable			67.00
Stainless	00.00	to	07.00
	110.00		990 00
18-8 bundles	15.00	10	120.00
18-8 turnings	10.00	10	120.00

Buffalo			
No. 1 hvy. melting	\$34.00	to	\$35.00
No. 2 hvy. melting	29,00		
No. 1 busheling	34.00		
No. 1 dealer bundles	*34.00	to	35.00
No. 2 bundles	24.00	to	25.00
Machine shop turn	17.00	to	18.00
Mixed bor. and turn	19.00	to	20.00
Shoveling turnings	21.00	to	22.00
Cast iron borings	19.00	to	20.00
Low phos. plate	39.00	to	40.00
Structurals and plate			
2 ft and under	43.00	to	44.00
Scrap rails, random lgth	41.00	to	42.00
Rails 2 ft and under	51.00	to	52.00
No. 1 machinery cast	51.00	to	52.00
No. 1 cupola cast	47.00	to	48.00

St Louis

ST. LOUIS			
No. 1 hvy. melting	\$36.00	to	\$37.00
No. 2 hvy. melting	33.00	to	34.00
No. 1 dealer bundles	38.00	to	39.00
No. 2 bundles	26.00	to	27.00
Machine shop turn	16.00	to	17.00
Shoveling turnings	18,00	to	19.00
Cast iron borings	20.00	to	21.00
No. 1 RR hvy. melting	41.00	to	42.00
Rails, random lengths	47.00	to	48.00
Rails, 18 in. and under	52.00	to	53.00
Angles and splice bars	47.00	to	48.00
RR specialties	45.00	to	46.00
Cupola cast	49.00	to	50.00
Heavy breakable cast	40.00	to	41.00
Cast iron brake shoes	37.00	to	38.00
Stove plate	44.50	to	45.50
Cast iron car wheels	42.00	to	43.00
Rerolling rails	58.00	to	59.00
Unstripped motor blocks	41.00	to	42.00

Birmingham

Dir minguam			
No. 1 hvy. melting	\$32.00	to	\$33.00
No. 2 hvy. melting	28.00		
No. 1 dealer bundles	33.00	to	34.00
No. 2 bundles	21.00	to	22.00
No. 1 busheling	33.00	to	
Machine shop turn	23.00	to	24.00
Shoveling turnings	24.00	to	25.00
Cast iron borings	14.00	to	15.00
Electric furnace bundles	37.00	to	38.00
Elec. furnace, 3 ft & under	36.00	to	37.00
Bar crops and plate	41.00		42.00
Structural and plate, 2 ft.	40.00	to	41.00
No. 1 RR hvy. melting	37.00	to	38.00
Scrap rails, random lgth	43.00		44.00
Rails, 18 in. and under	49.00		50.00
Angles and splice bars	44.00		45.00
Rerolling rails	55.00		56.00
No. 1 cupola cast	53.00	to	54.00
Stove plate	53.00	to	54.00
Cast iron car wheels	40.00		41.00
Unstripped motor blocks	40.00		41 00

New York

Brokers buying prices per gross ton on cars:
No. 1 hvy. melting\$27.00 to \$28.00
No. 2 hvv. melting 24.00 to 25.00
No. 2 dealer bundles 18.00 to 19.00
Machine shop turnings 12.00 to 13.00
Mixed bor, and turn 15.00 to 16.00
Shoveling turnings 16.00 to 17.00
Clean chem. cast. borings. 23.00 to 25.00
No. 1 machinery cast 37.00 to 38.00
Mixed vard cast
Heavy breakable cast 33.00 to 34.00
Stainless
18-8 prepared solids195.00 to 200.00
18-8 turnings 85.00 to 90.00
430 prepared solids 85.00 to 90.00
430 turnings 20.00 to 25.00

Delloll			
Brokers buying prices per gro	as ton	01	a cars:
No. 1 hvy, melting	30.00	to	\$51.00
No. 2 hvy. melting	23.00	to	24.00
No. 1 dealer bundles	32.00	to	33.00
No. 2 bundles	19.00	to	20.00
No. 1 busheling	30.00	to	31.00
Drop forge flashings	29.00	to	30.00
Machine shop turn	12.00		13.00
Mixed bor, and turn	14.00		15.00
Shoveling turnings	15.00		16.00
	14.00		
Cast iron borings	35.00		
Heavy breakable cast	43.00		
Mixed cupola cast			
Automotive cast	49.00	to	50.00
Stainless			
18-8 bundles and solids.	210.00	to	215.00
18-8 turnings	00,00	to	105.00
100 to 11 - 11 - 11 do 1	00 00	400	105 00

430 bundles and solids. . 100.00 to 105.00

DOSTOR		
Brokers buying prices per gro	ss ton	on cars:
No. 1 hvv. melting	26.00	to \$27.00
No. 2 hvy, melting	22,00	to 23.00
No. 1 dealer bundles	26.00	to 27.00
No. 2 bundles	17.00	to 18.00
No. 1 busheling	26.00	to 27.00
Machine shop turn	10,00	to 11.00
Shoveling turnings	13.00	to 14.00
Clean cast. chem. borings.	18.00	to 19.00
No. 1 machinery cast	33,00	to 34.00
Mixed cupola cast	33,00	to 34.00
	31.00	to 32.00
Stove plate	29.00	to 30.00

San Francisco

No. 1 hvy. melting	\$36.0
No. 2 hvy. melting	
No. 1 dealer bundles\$32.00 to	34.0
No. 2 bundles	22.
Machine shop turn	17.0
Cast iron borings	17.0
No. 1 cupola cast 44.00 to	45.0

LUS Allgeles	
No. 1 hvy melting	\$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	21.00
Machine shop turn\$16.00 to	17.00
Shoveling turnings 18.00 to	19.00
Cast iron borings 18.00 to	19.00
Elec. furn. 1 ft and under	
(foundry)	49.00
No. 1 cupola cast	45.00

Seat	tle								
		meltin							\$35.00
		meltin							33.0
		les							22.0
No. 1	cupol	a cast.	 	8			×	*	36.00
Mixed	yard	cast.		×					36.0

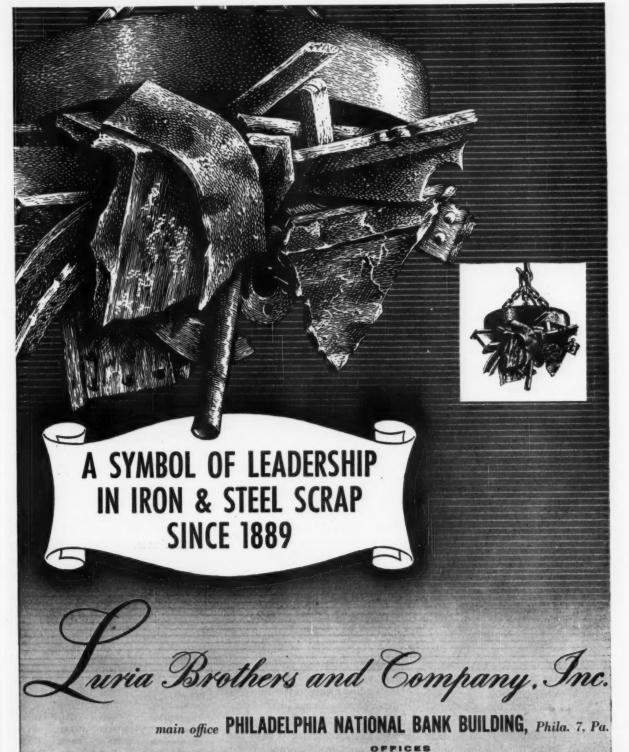
Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting \$34.5	(
No. 2 hvy. melting 30.5	(
No. 1 dealer bundles 34.5	(
No. 2 bundles 25.0	(
Mixed steel scrap 26.5	(
Bush., new fact., prep'd 34.5	(
Bush., new fact., unprep'd 28.5	(
Machine shop turn 13.0	
Short steel turn 17.0	(
Mixed bor. and turn 13.0	
Rails, rerolling 37.0	
Cast scrap\$46.50 to 48.0	(

Houston

Houston			
Brokers buying prices per g	TO55	ton	
No. 1 hvy. melting			\$36.06
No. 2 hvy. melting		0 0	33.00
No. 2 bundles		9.6	23.00
Machine shop turn			16.00
Shoveling turnings			20.00
Cut structural plate			
2 ft & under	.\$46	.00 1	to 47.00
Unstripped motor blocks.			
Cupola cast	. 45	.00	to 46.00
Transver huse lee bla send	20	00	94 00

TH



PLANTS

LEBANON, PENNA. DETROIT (ECORSE), READING, PENNA. MICHIGAN MOBENA, PENNA. PITTSBURGH, PENNA. ERIE, PENNA. BIRMINGHAM, ALA. BOSTON, MASS. BUFFALO, NEW YORK CNICAGO, ILLINOIS CINCINNATI, ONIO CLEVELAND, ONIO DETROIT, MICHIGAN HOUSTON, TEXAS KOKOMO, INDIANA

LOS ANGELES, CAL. MEMPHIS, TENNESSEE NEW YORK, NEW YORK PHILADELPHIA, PENNA. PITTSBURGH, PENNA. PUEBLO, COLORADO READING, PENNA. ST. LOUIS, MISSOURI SAN FRANCISCO, CAL. SEATTLE, WASHINGTON

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Will Aluminum Sign Labor Pacts First?

There's a chance aluminum makers may pull a switch and sign first, setting the pace for steel.

The trade has good reason to expect a summer price hike.

■ A new and intriguing possibility was being pondered in the aluminum industry this week.

If the steel industry has a very long strike, might the aluminum industry pull a switch by settling with its unions, thereby setting the pace for steel?

Most observers don't think so. But they agree that this year the possibility can't be dismissed lightly. It depends, say some fence sitters, on how much now being said by steel management and labor is for real, and how much for effect.

Here's the picture:

The United Steelworkers AFL-CIO is one of the major unions in the aluminum industry, as it is the major union in steel. The other is Aluminum Workers of America, independent. Their contracts in aluminum run out a month after contracts in the steel industry. Usually, new aluminum pacts are patterned after steel's.

What's different this year?

For one thing, the steel companies appear to be ready to take a much firmer stand against union demands. Many experts see a good chance of a strike.

In the aluminum industry prices are frozen until July 1, a decision of the producers. And producers have been operating at around record tonnage levels yet at only 80 to 85 pct of capacity.

These factors have pretty well convinced users there is no need for price or supply hedging. Yet demand has moved up notably.

It all adds up to (1) A rocksolid aluminum market, booming but not swollen with hedge buyers, and (2) plenty of idle capacity to build up smelter stocks if strakes appear likely.

Price Hike — And the sagging profits lamented by most aluminum annual reports for 1958, along with the frozen prices for the first half of 1959, make it look like producers can pass along any increased cost to the consumer. They seem to have less reason to hold an uncompromising position.

On the price outlook, you'll have to go a long way to find an experienced aluminum man who isn't pretty well convinced the price is going up this summer.

Sharp competition has kept some mill item markets pliable.

Want Money to Spend — But more than balancing this is the new and vigorous interest of the producers in foreign markets. Both U. S. and Canadian companies will be spending plenty to buy into some ripening overseas markets.

And more than that. A government man, whose job it is to keep an eye on Europe's economy, says the average European has now been conditioned to expect a continuous improvement in his standard of living. U. S. aluminum producers grew up on this kind of market. If they try to follow the pattern they will pour millions into advertising and

sales promotion to up per capita consumption closer to U. S. rate.

Some observers even suggest that if aluminum companies can settle with unions before contracts expire, they will announce the higher price right away, effective August 1, to give consumer a little room for some last-minute hedging.

Copper

Evidently, the lull in the storm of copper buying hasn't reassured many on either side of the market.

An executive of a major producer says hedge buying to date is only a sample of what's to come.

And a copper purchasing agent of a major user looks at the tohedge or not-to-hedge dilemma and says, "The monkey is really on our back."

What it all means is, no matter which way the market goes this isn't going to be a simple year for copper. The price will likely drop if there aren't strikes this year, to 27ϕ per lb, from producers.

And if there are strikes, the price will take off. The consensus is it can't come near the 46¢ ceiling of 1956. But it could crowd 40¢.

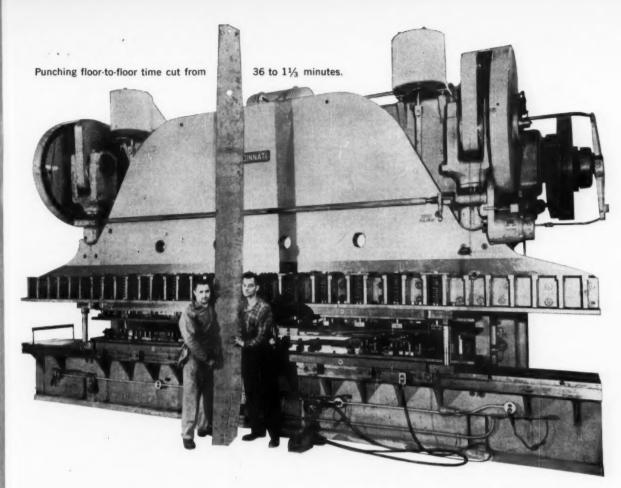
Tin prices for the week: March 25—102.375; March 26—102.75; March 27—no trading; March 30—102.75; March 31—103.00.*

*Estimate.

Primary Prices

(cents per lib)	ourrent price	iast price	date of change
Aluminum pig	24.70	24.06	8/1/88
Aluminum Inget	20.80	26.18	8/1/88
Copper (E)	31.50	30.60	3/9/89
Copper (CS)	34.00	32.00	3/16/59
Copper (L)	31.00	30.00	3/9/69
Lead, St. L.	11.30	10.80	3/5/69
Lead, N. Y.	11.80	11.00	3/5/89
Magnesium Inget	30.00	34.00	8/13/86
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/8/68
Titanium sponge	182-182	185-206	11/3/00
Zine, E. St. L.	11.00	11.60	2/25/50
Zinc, N. Y.	11.50	12.00	2/25/89

ALUMINUM: 99% Ingot frt aliwd. COP-PER: (E) — electrolytic, (CS) — custem ameiters, electrolytic. (L) — lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZING: prime western. Tin: See above; Other primary prices, pg. 126.



Photos courtesy Fort Wayne Structural Steel Co., Inc.

70 minutes cut to 2.6 minutes



d

Blanking floor-to-floor time cut from 34 to $1\frac{1}{4}$ minutes.

Production time has been reduced 96.2% on these long truck side rail reinforcements, thanks to the versatility of this Cincinnati[®] All-Steel Press Brake.

Operating data, furnished by John L. Hayner, President of Fort Wayne Structural Steel Co., Inc., show how his company slashed production costs so substantially.

They decreased floor-to-floor time from 34 minutes to 1¼ minutes on blanking ¼" C1010 Steel with a 202" cutting edge. By punching 130 holes per stroke, they dropped floor-to-floor time from 36 minutes to 1½ minutes.

Talk with our Application Engineering department about applying a time-cutting Cincinnati Press Brake in your shop. It can be the most profitable decision you've made this year. Write Department B for Press Brake catalog.



Cincinnati 11, Ohio, U.S.A.

Shapers / Shears / Press Brakes

SHAPER ...

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed) Flat Sheet (Mill Finish and Plate) ("F" temper except 6061-0)

Alloy	.032	.081	.136	3.
1100, 3003	45.7	43.8	42.8	43.3
	53.1	48.4	46.9	46.0
	50.1	45.7	43.9	44.9

Extruded Solid Shapes

	1	a	10	t	01	P		_	-		_	6063 T-5	6062 T-6
6-8												42.7-44.2	51.1-54.8
12-14												42.7-44.2	52.0-56.5
24-26												43.2-44.7	62.8-67.5
36-38												46.7-49.2	86.9-90.5

Screw Machine Stock-2011-T-3

Size"	34	36-36	%-1	114-114		
Price	62.0	61.2	59.7	57.3		

Roofing Sheet, Corrugated

(Per sheet,	26" wie	le base	, 16,000	1b)
Length"→	72	96	120	144
.019 gage		\$1.884 2.349	\$2.353 2.937	\$2.823 3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed) Sheet and Plate

Type→	Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Sta Grade	nd,		67.9	69.0	77.9	108,1
AZ31B Spe	ec		93.3	95.7	108.7	171.3
Tread Plat	e		70.6	71.7		
Tooling Pl	ate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

NICKEL, MONEL, INCONEL

(Base	prices f.o.	b. mill)	
	"A" Nickel	Monel	Inconel
Sheet, CR	. 126	106	128
Strip, CR		108	138
Rod, bar, HR.	. 107	89	109
Angles, HR		89	109
Plates, HR		105	121
Seamless tube		129	200
Shot blocks .		87	

COPPER, BRASS, BRONZE (Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63		52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.65
Brass, Low	51.23	81.77	81.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80		46',61	56.21
Munts Metal	50.85		46.16	
Comm. Br.	53.90	54.44	53.84	56.96
Mang. Bs	56.54		80.14	
Phos. Bz. 5%	75.34		75;84	

TITANIUM

(Base prices, f.o.b. mill)

(Base prices, f.o.b. msil)

Sheet and strip, commercially pure, \$6.90\$7.40; alloy, \$14.35, Plate, HR, commercially pure, \$6.00-\$5.75; alloy, \$7.75-\$8.50. Wire, rolled and/or drawn, commercially pure, \$5.50\$6.00; alloy, \$8.00-\$9.50; Bar, HR or forged, commercially pure, \$4.25-\$4.65; alloy, \$4.25\$7.15; billets, HR, commercially pure, \$3.55-\$4.10; alloy, \$3.55-\$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)
Antimony, American, Laredo, Tex 29.56 Beryllium aluminum 5% Be, Dollar
per lb contained Be
Beryllium copper, per lb conta'd Be.\$43.00
Beryllium 97% lump or beads,
f.o.b. Cleveland, Reading\$71.50
Bismuth, ton lots\$ 2.28
Cadmium, del'd 1.48
Calcium, 99.9% small lots \$ 4.58
Chromium, 99.8% metallic basis\$ 1.31
Cobalt, 97-99% (per lb)\$1.75 to \$1.83
Germanium, per gm, f.o.b. Miami,
Okla., refined
Gold, U. S. Treas., per troy oz\$35.00
Indium, 99.9%, dollars per troy oz\$ 2.28
Iridium, dollars per troy oz\$75 to \$85
Lithium, 98%\$11.00 to \$14.06
Magnesium, sticks, 100 to 500 lb 59.00
Maroury dollars non 76 th Angle

Mercury, dollars per 76-lb flask f.o.b. New York ... \$225 to \$228 Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained pickel

contained nici														
Palladium, dolla	rs	p	61	1	tr	03	V	03	t		. \$	1	6	to \$18
Platinum, dollar	8	Di	er	1	tr	03	r	01			. \$	7	7	to \$80
Rhodium						\$	12	0.	.0	0	ŧ	0	\$	125.00
Silver ingots (¢	p	er	. 1	r	DУ	,	02	(.)						91.375
Thorium, per k	g.		0 1											\$43.00
Vanadium														\$ 3.45
Zirconium spong	ŗe										0 4			\$ 5.00

REMELTED METALS

Brass Ingot

	Cente			eı	e	ı	b	1	d	6	li	v	6	r	8	d		0	a	r	h	26	34	de)
85-5-																									
	. 115					,																	۰		32.25
			0	0	0			0	0				0	۰		9			٠					6	31.00
								0			۰		0						0		۰				30.00
80-10																									
No.	305																	۰							36.56
	315															9									34.56
88-10	-2 in	20	£																						
No.	210								n						0										45.50
																									41.21
No.																									37.06
Yello										•	•	•				•	•	•	٠	-	٠	٠	•		
No.	405									9						٠					9		0		26.50
Mang		3 1	b	r	01	ni	24	B																	
No.	421																								29.75

Aluminum Ingot

(Cents per it del'a 30,000 lb and over)
95-5 aluminum-silicon alloys
0.30 copper max24.75-25.00
0.60 copper max24.50-24.75
Piston alloys (No. 122 type) 24.25-25.25
No. 12 alum. (No. 2 grade) 21.50-22.06
108 alloy
195 alloy
13 alloy (0.60 copper max.)24.25-24.75
AXS-679 (1 pet zine)21.75-22.25

(Effective March 30, 1959)

Steel deoxidizing aluminum notch bar

	3		-	_		-					-		
Grade	1-95-97 1/2	%											.22.50-23.50
Grade	2-92-95%						0	0		0	0		.21.25-22.25
	3-90-92%		0	0	0	0		0	0	0	0	0	. 20.25-21.25
Grade	4-85-90%		۰	0	0	0	0	0		0	0		.17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per shipments	pound, add 1¢ pe of 20,000 lb and	r lb for over)
	Heavy	Turning
Copper	27 1/2	26%
Yellow brass	20 %	18%
Red brass		23 1/2
Comm. bronz		24%
Mang. bronze	19%	18%
Free cutting r	od ends. 20 1/2	

Customs Smelters Scrap

to reanery)	
	90.1
No. 1 copper wire	29 14
No. 2 copper wire	27 %
Light copper	25 1/2
*Refinery brass	27 %
Copper bearing material	26 1/4
Dry copper content.	

(Cex	ы	s per	r p	91	na		70	-	-	PC	16		U	a,	delivere	ш
					0.5										00.1	
No.	1	copi	per	W	ire							 			29 5	4
No.	2	CODI	per	W	ire							 			273	
Ligh															251	/2
No.															221	h
No.	1	com	p ti	ur	nin	g	В					 			223	4
Hvy.															17	
Bras	8	pipe										 			173	6
		tors													175	6

Mixed old cast. 12 Mixed new clips 15 Mixed turnings, dry 13 Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire 26 ½ 27 No. 2 copper wire 24 ½ 25 Light copper 22 ½ 23 Auto radiators (unsweated) 16 ½ -16 No. 1 composition 21 -21 No. 1 composition turnings 20 -20 Cocks and faucets 16 ¾ -17	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	
Auto radiators (unsweated) 16 ¼—16 No. 1 composition 21 —21 No. 1 composition turnings 20 —20 Cocks and faucets 16 ¾—17	
No. 1 composition	
No. 1 composition turnings 20 —20 Cocks and faucets 16%—17	3/
Cocks and faucets 16%-17	
Cocks and faucets 16 %-17	
Clean heavy yellow brass 15 -15	3/4
Brass pipe 1634-17	
New soft brass clippings 171/2-18	
No. 1 brass rod turnings 14%-15	
Aluminum	
Aivminum	

Aluminum crankcases	934-10
1100 (2s) aluminum clippings	13 -13 1/4
Old sheet and utensils	914-10
Borings and turnings	6 - 6 1/2
Industrial castings	91/4-10
2020 (24S) clippings	11 -111/2
Zinc	

New zinc clippings 4 % - 5 % Old zinc 3 % - 3 % Zinc routings 2 - 2 %

Old die cast scrap	1%- 2
Nickel and Monel	
Pure nickel clippings	52-54
Clean nickel turnings	37-40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	26-28
Nickel Silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

		_	-	-	-							
Soft scrap	lead		۰			0	0	0 1	- 6	14-		
Battery pla	tes	(dry)						2	-		
Batterles, a	reid i	ree					•	0 1	 1	%-	2	
	M	scel	le	31	10	He	W	8				
Diook sin									78		-	

Block tin No. 1 pewter Auto babbitt Mixer common babbitt Solder joints Siphon tops Small foundry type

Monotype Lino. and stereotype Electrotype Hand picked type shells Lino. and stereo. dross . Electro dross

11	RON AGE		Italies ide	ntify produce	ers listed in	key at end of	table. Bas	e prices, f.o.b.	mill, in cents	per lb., unless o	therwise no	ted. Extra	apply.	
	STEEL	BILLE	TS, BLO SLABS	OMS,	PIL- ING		SHAPES				STR	IP		
F	PRICES	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
	Bethlehem, Pa.			\$119.00 B3		5.55 B3	8.10 B3	5.55 B5						
	Buffalo, N. Y.	\$80.00 R3,	\$99.50 R3, B3	\$119.00 R3, B3	6.50 B3	5.55 B3	8.10 B3	5.55 B3	5.10 B3, R3	7.425 S10, R7	7.575 B3			
	Phila., Pa.									7.875 P15				
	Harrison, N. J.			3			-							15.55 C/
	Conshohecken, Pa.		\$104.50 /42	\$126.00 A2			-		5.15 A2		7.575 A2			
	New Bodford, Mass.						-			7.875 R6				
	Johnstown, Pa.	\$80.00 B3	\$99.50 B3	\$119.00 B3		5.55 B3	8.10 B3	-						
EAST	Boston, Mass.									7.975 T8				
m	New Haven, Conn.									7.875 DI				
	Baltimore, Md.									7.425 T8				15.90 T
	Phoenixville, Pa.					5.55 P2		5.55 P2						
	Sparrows Pt., Md.								5.10 B3		7.575 B3			
	New Britain, Bridgeport, Wallingford, Conn.			\$119.00 N8						7.875 W1,S7				
	Pawtucket, R. I. Worcester, Mass.									7.975 N7, A5				15.98 N 15.78 T
-	Alton, III.					_			5.30 L1					
	Ashland, Ky.								5.10 47		7.575 A7			
	Canton-Massillon, Dover, Ohio		\$102.00 R3	\$119.00 R3, \$114.00 T5						7.425 G#		10.80 G4		
	Chicago, Franklin Park, Evanston, III.	\$80.00 UI, R3	\$99.50 UI, R3,W8	\$119.00 UI, R3,W8	6.50 UI	5.50 UI, W8,P13	8.05 UI. YI,W8	5.50 UI	5.10 W8, N4,A1	7.525 <i>A1</i> , <i>T8</i> , <i>M8</i>	7.575 W8		8.40 W8, S9,13	15.55 A S9,G4,
	Cleveland, Ohio									7.425 A5, J3		10.75 A5	8.40 /3	
	Detrait, Mich.			\$119.00 R5					5.10 G3,	7.425 M2, SI,	7.575 G3	10.80 SI		
							-	-	M2	DI,PII				
WEST	Anderson, Ind.	****	200 Po F/4	**** ** ***		F 70 1/1	0.05711	F F0 12	E 10.7/5	7.425 G4	2 525 511	10 00 VI	0.40.511	
	Gary, Ind. Harbor, Indiana	\$80.00 U1	\$99.50 U1	\$119.00 UI, YI		5.50 UI, 13	8.05 UI, J3	5.50 /3	\$.10 UI, 13, YI	7.425 Y1	7.575 UI, 13, YI	10.90 Y/	8.40 UI, YI	
MIDDLE	Sterling, Ill.	\$80.00 N4	-			5.50 N4	7.75 N4	5.50 N4	5.20 N4	2 C 2 C 2 C 2				45 mg 5
X	Indianapolis, Ind.					-	-		7.00 40	7.575 R5			0.00.40	15.70 R
	Newport, Ky.						-		5.10 A9	2 405 82		10.00 B1	8.40 A9	10.00.0
	Niles, Warren, Ohio Sharon, Pa.		\$99.50 SI, CIO	\$119.00 C10,S1					\$.10 R3, S1	7.425 R3, T4,SI	7.575 R3, S1	10.80 R3, Si	8.40 S/	15.55 S
,	Owensboro, Ky.	\$80.00 G5	\$99.50 G5	\$119.00 G5	6.50 UI	F F0 1/1	2051//	5.50 UI	5 10 DC	2 49E 12 D4	-		8.40 59	15 55 0
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	\$88.00 UI, P6	\$99.50 UI, CII,P6	\$119.00 UI, CII,B7	6.50 07	5.50 UI, J3	8.05 U1, J3	5.50 07	\$.10 P6	7.425 <i>J3,B4</i> 7.525 <i>E3</i>			8,40 39	15.55 5
	Weirten, Wheeling, Follansbee, W. Va.				6.50 UI, W3	5.50 H/3		5.50 W3	5.10 W3	7.425 F3	7.575 W3	10.80 W3		
	Youngstown, Ohio	\$80.00 R3	\$99.50 YI, C10	\$119.00 Y/			8.05 Y/		5.10 U	7.425 Y1,R5	7.575 U1, YI	10.95 Y/	8.40 UI, YI	15.55 R
	Fontana, Cal.	\$90.50 K/	\$109.00 K/	\$140.00 K1		6.30 K1	8.85 K1	6.45 K1	5.825 K1	9.20 KI				
	Geneva, Utah		\$99.50 C7			5.50 C7	8.05 C7							
	Kansas City, Mo.					5.60 5.7	8.15 S2						8.65 S2	
	Los Angeles, Torranco, Cal.		\$109.00 B2	\$139.00 B2		6.20 C7, B2	8.75 B2		5.85 C7, B2	9.30 C1,R5			9.60 B2	17.75 J
WEST	Minnequa, Colo.					5.80 C6			6.20 C6	9.375 C6				
	Portland, Ore.		_			6.25 02								
	San Francisco, Niles, Pittsburg, Cal.		\$100.00 B2			6.15 B2	8.70 B2		5.85 C7, B2					7
	Seattle, Wash.		\$113.00 B2			6.25 B2	8.80 B2		6.10 B2					
	Atlanta, Ga.					5.70 A8			5.10 A8					
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	\$80.00 72	\$99.50 T2			5.50 T2 R3,C/6	8.05 72		\$.10 T2, R3,C/6		7.575 T2			
100	Houston, Lone Star,		\$104 50 S2	\$124.00 S2		5.60 52	8.15 S2						8.65 S2	

3.50 2.25 1.25 8.50

ngs

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IRO

EAST

	IRON AGE		Italics idea	ntify producers	listed in key	at end of tabl	e. Base price	s, f.o.b. mill, i	n cents per lb	, unless other	wise noted. E	ztras apply.	
	STEEL				SHE	ETS				WIRE ROD	TINP	LATE†	
1	PRICES	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized (Hot-dipped)	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloward Enameling 29 ga.
	Buffalo, N. Y.	5.10 B3	6.275 B3				7.525 B3	9.275 B3		6.40 W6	deduct 35¢ f	ted mfg. terne rom 1.25-lb.	
	Claymont, Del.										coke base be lb./0.25 lb. a	x price, 0.75 dd 55¢.	
	Coatesville, Pa.										Can-makir BLACKPLA	E 55 to 128	
	Conshohocken, Pa.	5.15 A2	6.325 A2				7.575 A2		-		lb. deduct \$2 1.25 lb. coke * COKES:	base bex.	
	Harrisburg, Pa.										add 25é.	: 0.50-lb. add	
	Hartford, Conn.										25¢; 0.75-lb.	add 65¢; 1.00-	
EAST	Johnstown, Pa.									6.40 B3	1.00 lb./0.25	Differential lb. add 65¢.	
	Fairless, Pa.	5.15 UI	6.325 UI				7.575 UI	9.325 UI			\$10.50 UI	\$9.20 UI	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 B3	6.275 B3	6.875 B3			7.525 B3	9.275 B3	10.025 B3	6.50 B3	\$10.40 B3	\$9.10 B3	
	Worcester, Mass.									6.70 A5			
	Trenton, N. J.												
_	Alton, III.									6.60 L1			
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7		7.525 A7						
	Canton-Massillon, Dover, Ohio			6.875 R1,									
	Chicago, Jeliet, Ill.	5.10 W8,		R3			7.525 UI, W8			6.40 A5, R3,W8			
	Sterling, III.									6.50 N4, K2			
	Cleveland, Ohio	5.10 R3,	6.275 R3,	7.65 R3°	6.775 R3		7.525 R3,	9.275 R3,		6.40 A5			
	Detroit, Mich.	5.10 G3,	6.275 G3,				7.525 G3	9.275 G3					
	Newport, Ky.	5.10 Al	6.275 A1										
ST	Gary, Ind. Harber,	5.10 UI,	6.275 UI.	6.875 UI,	6.775 UI,	7.225 UI	7.525 UI,	9.275 UI,		6.40 Y/	\$10.40 UI,	\$9.10 <i>13</i> ,	7.85 UI,
WEST	Indiana	13,Y1	13,YI	13	13, Y1		Y1,13	YI			YI	UI,YI	71
MIDDLE	Granite City, III.	5.20 G2	6.375 G2	6.975 G2	6.875 G2			-		- Fa CO		\$9.20 G2	7.95 G2
M	Kekeme, Ind. Manafield, Ohio	5.10 E2	6 975 F2	6.975 C9		7 225 52				6.50 C9			
	Middletown, Ohio	3.10 2.2	6.275 E2 6.275 A7	6.875 A7	6.775 A7	7.225 E2 7.225 A7							
	Niles, Warren, Ohio	5.10 R3,	6.275 R3	6.875 R3	6.775 SI	7.225 SI*,	7.525 R3,	9.275 R3,				\$9.10 R3	
	Sharen, Pa. Pittsburgh,	5.10 UI.	6.275 UI.	7.65 R3*	6.775 UI	R3	7.525 UI,	9.275 UI,	10.025 UI.	6.40 A5,	\$10.40 W5,	\$9.10 UI,	7.85 UI,
	Midland, Butler, Denora, Aliquippa, McKeesport, Pa.	J3,P6	J3,P6	J ³ 7.50 E ³ *			J3	J3	J3	J3,P6	J3	73]3
	Portsmouth, Ohio	5.10 P7	6.275 P7							6.40 P7			
	Weirton, Wheeling, Fellansbee, W. Va.	5.10 W3, W5	6.275 W3, F3,W5	6.875 W3, W5 7.50 W3°		7.225 W3, W5	7.525 W3	9.275 W3			\$10.40 W5, W3	\$9.10 W5, W3	7.85 W5
	Youngstown, Ohio	5.10 UI, YI	6.275 YI	7.50 J3*	6.775 YI		7.525 Y/	9.275 YI		6.40 YI			
_	Fontana, Cal.	5.825 K1	7.40 KI				8.25 <i>KI</i>	10.40 KI			\$11.05 KI	\$9.75 <i>K1</i>	
	Geneva, Utah	5.20 C7											
ST	Kansas City, Mo.									6.65 S2			
WEST	Los Angeles, Torrance, Cal.									7.20 B2			
	Minnequa, Colo.		-	-						6.65 C6			
	San Francisco, Niles, Pittaburg, Cal.	5.80 C7	7.225 C7	7.625 C7						7.20 C7	\$11.05 C7	\$9.75 C7	
_	Atlanta, Ga.												
SOUTH	Fairfield, Ala. Alabama City, Ala.	5.10 T2,	6.275 T2, RJ	6.875 T2, R3	6.775 T2					6.40 T2,R3	\$10.50 72	\$9.20 T2	
	Heuston, Texas									6.65 S2			

	STEEL			BA	RS				PLA	TES		WIRE
-	PRICES	Carbon† Steel	Reinforc-	Cold Finished	Alloy Flot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
	Bethlehem, Pa.				6.725 B3	9.025 B3	8.30 B3					
	Buffalo, N. Y.	5.675 R3,B3	5.675 R3,B3	7.70 B5	6.725 B3,R3	9.025 B3,B5	8.30 B3	5.30 B3				8.00 W6
	Claymont, Del.							5.30 C4		7.50 C4	7.95 C4	
	Coatesville, Pa.							5.30 L4		7.50 L4	7.95 L4	
	Conshohocken, Pa.							5.30 /12	6.375 A2	7.50 /12	7.95 A2	
	Harrisburg, Pa.							5.30 P2	6.375 P2			
	Milton, Pa.	5.825 M7	5.825 M7			-						
	Hartford, Conn.			8.15 R3		9.325 R3						
EAST	Johnstown, Pa.	5.675 B3	5.675 B3		6.725 B3		8.30 B3	5.30 B3		7.50 B3	7.95 B3	8.00 B3
E	Fairless, Pa.	5.825 UI	3.825 UI		6.875 UI							
	Newark, Camden, N. J.			8.10 W10, P10		9.20 W10, P10						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 W10 8.15 J3	6.80 N8	9.175 N8						
	Sparrows Pt., Md.		5.675 B3					5.30 B3		7.50 B3	7.95 B3	8.10 B3
	Palmer, Worcester, Roadville, Mansfield, Mass.		,	8.29 B5, C14		9.325 A5,B5						8.30 A5, W6
	Spring City, Pa.			8.10 K4		9.20 K4						
_	Alton, III.	5.875 <i>L1</i>										8.20 L/
	Ashland, Newport, Ky.							5.30 A7, A9		7.50 A9	7.95 A7	
	Canton, Massillon, Mansfield, Ohio	6.15° R3		7.65 R3,R2	6.725 R3 6.475 T5	9.025 R3,R2 8.775 T5		5.30 E2				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 U1,R3, W8,N4,P13	5.675 UI,R3, N4,PI3,W8 5.875LI	7.65 A5, W10,W8, B5,L2,N9	6.725 U1,R3, W8	9.025 A5, W10,W8, L2,N8,B5	8.30 UI,W8, R3	5.30 UI,AI, W8,I3	6.375 UI	7.50 UI, W8	7.95 UI, W8	8.00 A5,R W8,N4, K2,W7
	Cleveland, Elyria, Obio	5.675 R3	5.675 R3	7.65 A5,C13, C18		9.025 A5, C13,C18	8.30 R3	5.30 R5.J3	6.375 J3		7.95 R3,J3	8.00 A5, C13,C18
	Detreit, Mich.	5.675 G3	5.675 G3	7.90 P3 7.85 P8,B5 7.65 R5	6.725 R5,G3	9.025 R5 9.225 B5,P3, P8	8.30 G3	5.30 G3		7.50 G3	7.95 G3	
	Duluth, Minn.			1.00 1.0				-				8.00 /15
WEST	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 U1,13, Y1	\$ 675 UI,13, YI	7.65 R3,J3	6.725 U1,13, YI	9.025 R3,M4	8.30 UI, YI	5.30 U1,13, Y1	6.375 <i>J3</i> ,	7.50 UI, YI	7.95 UI, YI, I3	8.10 M4
MIDDLE	Granite City, III.							5.40 G2				
Q N	Kokomo, Ind.		5.775 C9								-	8.10 C9
_	Sterling, 111.	5.775 N4	5.775 N4					5.30 N4				8.10 K2
	Niles, Warren, Ohio Sharon, Pa.			7.65 C/O	6.725 C/0,	9.825 C10		5.30 R3,S1		7.50 SI	7.95 R3, S1	
	Owensboro, Ky.	\$.675 G5			6.725 G5							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	\$.675 U1,J3	5.675 U1, J3	7.65 A5,B4, R3,J3,C11, W10,S9,C8,	6.725 UI, J3, CII, B7	9.025 A5, W10,R3,S9, C11,C8,M9	8.30 UI,J3	5.30 UI,J3	6.375 <i>UI</i> .J 3	7.50 UI, J3,B7	7.95 U1, J3,B7	8.00 A5, J3,P6
	Postanovsk Otio			MY								8.00 P7
	Portsmouth, Ohio							5.30 W5				5.00 P/
	Weirton, Wheeling, Follansbee, W. Va.							3.30 17 2				
	Youngstown, Ohio	5.675 UI,R3, YI	5.675 U1,R3, Y1	7.65 AI, YI, F2	6.725 UI, YI	9.025 Y1,F2	8.30 UI, YI	5.30 UI, R3, Y1		7.50 Y/	7.95 UI, YI	8.00 Y/
	Emeryville, Fontana, Cal.	6.425 <i>J5</i> 6.375 <i>K1</i>	6.425 <i>J5</i> 6.375 <i>KI</i>		7.775 KI		9.00 KI	6.10 KI		8.30 K1	8.75 <i>K1</i>	
	Geneva, Utah			,				5.30 C7			7.95 C7	
	Kansas City, Mo.	5.925 S2	5.925 S2		6.975 S2		8.55 S2					8.25 S2
WEST	Los Angeles, Torrance, Cal.	6.375 C7,B2	6.375 C7,B2	9.10 R3,P14, S12	7.775 B2	11.00 P14, S/2	8.625 B2		-			8.95 B2
4	Minnequa, Colo.	6.125 C6	6.125 C6					6.15 C6				8.25 C6
	Portland, Ore.	6.425 02	6:425 02									
	San Francisco, Niles, Pittsburg, Cal.	6.375 C7 6.425 B2	6.375 C7 6.425 B2				8.675 B2					8.95 C7,C
	Seattle, Wash.	6.425 B2,N6	6.425 B2				8.675 B2	6.20 B2		8.40 B2	8.85 B2	
	Atlanta, Ga.	5.875 A8	5.675 A8									8.00 A8
SOUTH	Fairfield City, Ala. Birmingham, Ala.	5.675 T2,R3, C16	5.675 T2,R3, C16	8.25 C/6			8.30 T2	5.30 T2,R3			7.95 T2	8.00 T2,R
20	Houston, Ft. Worth,	5.925 S2	5.925 S2	10000	6.975 S2	1	8.55 S2	5.40 S2		7.60 S2	8.05 S2	8.25 S2

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Key to Steel Producers

With Principal Offices

- Al Acme Steel Co., Chicago
- Alan Wood Steel Co., Conshohocken, Pa.
- Allegheny Ludlum Steel Corp., Pittsburgh
- 14 American Cladmetals Co., Carnegie, Pa.
- American Steel & Wire Div., Cleveland 15
- Angel Nail & Chaplet Co., Cleveland
- A7 Armco Steel Corp., Middletown, Ohio
- AR Atlantic Steel Co., Atlanta, Ga.
- A9 Acme-Newport Steel Co., Newport, Ky.
- #1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
- B12 Bethlehem Pacific Coast Steel Corp., San Francisco Bethlehem Steel Co., Bethlehem, Pa. B3
- Blair Strip Steel Co., New Castle, Pa.
- pr q Bliss & Laughlin, Inc., Harvey, Ill.
- Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa. RIS
- R7 A. M. Byers, Pittsburgh
- 88 Braeburn Alloy Steel Corp., Braeburn, Pa.
- Cl Calstrip Steel Corp., Los Angeles Carpenter Steel Co., Reading, Pa.
- C4 Claymont Products Dept., Claymont, Del.
- Ch Colorado Fuel & Iron Corp., Denver
- C7 Columbia Geneva Steel Div. San Francisco
- Columbia Steel & Shafting Co., Pittsburgh
- C9 Continental Steel Corp., Kokomo, Ind.
- C10 Copperweld Steel Co., Pittsburgh, Pa.
- C11 Crucible Steel Co. of America, Pittsburgh
- Cuyahoga Steel & Wire Co., Cleveland C14 Compressed Steel Shafting Co., Readville, Masa
- C15 G. O. Carlson, Inc., Thorndale, Pa.
- C16 Connora Steel Div., Birmingham
- C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
- DI Detroit Steel Corp., Detroit
- Driver, Wilbur B., Co., Newark, N. J. D2
- Driver Harris Co., Harrison, N. J. D4 Dickson Weatherproof Nail Co., Evanston, III.
- El Eastern Stainless Steel Corp., Baltimore
- FI Empire-Reeves Steel Corp., Mansfield, O.
- E3 Enamel Products & Plating Co., McKeesport, Pa.
- Firth Sterling, Inc., McKeesport, Pa.
- F2 Fitzsimons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
- Greer Steel Co., Dover, O. 65 Green River Steel Corp., Owenboro, Ky.
- HI Hanna Furnace Corp., Detroit
- 12 Ingersoll Steel Div., Chicago
- 13 Inland Steel Co., Chicago
- 14 Interlake Iron Corp., Cleveland
- J1 Jackson Iron & Steel Co., Jackson, O.
- 12 Jessop Steel Corp., Washington, Pa.
- 13 Iones & Laughlin Steel Corp., Pittsburgh
- Joslyn Mfg. & Supply Co., Chicago
- Judson Steel Corp., Emeryville, Calif.
- K1 Kaiser Steel Corp., Fontana, Calif.
- K2 Keystone Steel & Wire Co., Peoria Koppers Co., Granite City, III. K3
- K4 Keystone Drawn Steel Co., Spring City, Pa.
- L1 Laclede Steel Co., St. Louis
- 1.2 La Salle Steel Co., Chicago
- L3 Lone Star Steel Co., Dallas
- L4 Lukens Steel Co., Coatesville, Pa.
- MI Mahoning Valley Steel Co., Niles, O.
- M2 McLouth Steel Corp., Detroit
- Mercer Tube & Mig. Co., Sharon, Pa.
- M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
- M6 Mystic Iron Works, Everett, Mass.
- M7 Milton Steel Products Div., Milton, Pa.
- Mill Strip Products Co., Evanston, Ill.
- M9 Moltrup Steel Products Co., Beaver Falls, Pa.
- NI National Supply Co., Pittsburgh
- N2 National Tube Div., Pittsburgh
- Northwestern Steel & Wire Co., Sterling, Ill.
- N6 Northwest Steel Rolling Mills, Seattle
- N7 Newman Crosby Steel Co., Pawtucket, R. I.
- N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
- Nelson Steel & Wire Co.
- 01 Oliver Iron & Steel Co., Pittsburgh
- 02 Oregon Steel Mills, Portland
- PI Page Steel & Wire Div., Monessen, Pa.
- Phoenix Steel Corp., Phoenixville, Pa.
- P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
- Pittsburgh Coke & Chemical Co., Pittsburgh P4
- Pittsburgh Screw & Bolt Co., Pittsburgh P5
- Pittsburgh Steel Co., Pittsburgh
- Portsmouth Div., Detroit Steel Corp., Detroit
- Plymouth Steel Co., Detroit P8

- P9 Pacific States Steel Co., Niles, Cal.
- P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- P13 Phoenix Mfg. Co., Joliet, Ill.
- P14 Pacific Tube Co.
- P15 Philadelphia Steel and Wire Corp.
- R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
- R3 Republic Steel Corp., Cleveland
- Re Roebling Sons Co., John A., Trenton, N. J. R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
- R6 Rodney Metals, Inc., New Bedford, Mass.
- RI Rome Strip Steel Co., Rome, N. Y.
- SI Sharon Steel Corp., Sharon Pa. 52 Sheffield Steel Div Kansas City
- Shenango Furnace Co., Pittsburgh
- 53 Simonds Saw and Steel Co., Fitchburg, Mass
- \$5 Sweet's Steel Co., Williamsport, Pa.
- Stanley Works, New Britain, Conn. 57
- Superior Drawn Steel Co., Monaca, Pa. 58 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa. 59
- S10 Seneca Steel Service, Buffalo
- S11 Southern Electric Steel Co., Birmingham
- S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
- S13 Seymour Mfg. Co., Seymour, Conn.
- 71 Tonawanda Iron Div., N. Tonawanda, N. Y.
- Tennessee Coal & Iron Div., Fairfield T2
- 73 Tennessee Products & Chem. Corp., Nashville
- Thomas Strip Div., Warren, O. T4
- Timken Steel & Tube Div., Canton, O.
- 77 Texas Steel Co., Fort Worth Thompson Wire Co., Boston
- UI United States Steel Corp., Pittsburgh
- U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- U3 Ulbrich Stainless Steels, Wallingford, Conn. U4 U. S. Pipe & Foundry Co., Birmingham
- W1 Wallingford Steel Co., Wallingford, Conn. W2 Washington Steel Corp., Washington, Pa.
- W3 Weirton Steel Co., Weirton, W. Va
- We Wheatland Tube Co., Wheatland, Pa.
- W5 Wheeling Steel Corp., Wheeling, W. Va. W6 Wickwire Spencer Steel Div., Buffalo
- W7 Wilson Steel & Wire Co., Chicago.
- W8 Wisconsin Steel Div., S. Chicago, Ill. W9 Woodward Iron Co., Woodward, Ala.
- W18 Wyckoff Steel Co., Pittsburgh
- W12 Wallace Barnes Steel Div., Bristol, Conn. YI Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TURING

Base discounts (pct) f.e.b. mills. Base price about \$200 per net ton.

							BUTTY	WELD							SEAMLESS								
	1/2	in.	34	In.	11	in.	11/4	In.	11/2	lo.	21	in.	21/2	3 In.	2	lm.	21/4	la.	31	in.	31/2-	4 In.	
STANDARD T. & C.	Bik.	Gal.	Mik.	Gal.	Blk.	Gal.	Bik.	Gal.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Blk.	Gal.	Dik.	GaL	Bik.	Gal.	Blk.	Gal	
parrows Pt. B3	0.25 2.25	*13.0	3.25 5.25	*9.0	6.75 8.75	*6.50 *4.50	9.25 11.25	+5.75 +3.75	9.75 11.75	*2.75	12.25	+2.25	13.75	+2.50									
ittsburgh 13	2.25 0.25	*13.0 *15.0	5.25 3.25	*11.0	*4.25 8.75 6.75		*1.75 11.25 9.25	*16.75 *3.75 *5.75	11.75		12.25	*15.25 *2.25 *4.25	13.75	+4.50					*3.25		******		
haron M3airless N2	2.25 0.25 2.25	*15.0 *13.0	5.25 3.25 5.25	*9.0 *11.0 *9.0	8.75 6.75 8.75	*6.50 *4.50	9.25 11.25	*3.75 *5.75 *3.75	9.75 11.75	*4.75 *2.75	12.25 10.25 12.25	*4.25 *2.25	11.75	*4.50 *2.50	+12.25	*27.25	+5.75	+22.50	+3.25	+20.0	+1.75	*18.	
Vheeling W5	2.25 2.25 2.25	*13.0 *13.0	5.25 5.25 5.25	*9.0 *9.0 *9.0	8.75 8.75 8.75	*4.50 *4.50	11.25 11.25 11.25	*3.75 *3.75 *3.75	11.75 11.75 11.75	*2.75 *2.75 *2.75	12.25 12.25 12.25	*2.25 *2.25 *2.25	13.75	*2.50 *2.50	+12.25	*27.25	+5.75	+22.50	*3.25	*20.0	+1.75	*18.	
orain N2EXTRA STRONG	2.25		4.2S 5.2S	*10.0	7.75 8.75		10.25		10.75		11.25 12.25			*3.50 *2.50	+12.25	*27.25	+5.75	*22.50	*3.25	*20.0	+1.75	*18.5	
PLAIN ENDS	4.75		8.75	*5.0			12.25																
oungstown R3 airleas N2 outana K1	6.75 4.75 *6.25	+9.0	10.75 8.75 *2.25	*3.0 *5.0	11.75	*0.50	1.25	+1.75	12.75	+9.75	13.25	+0.25	13.75	+1.50					*0.75				
ittsburgh J3	6.75 4.75 6.75	*9.0		*3.0 *5.0 *3.0	11.75	1.50	14.25 12.25 14.25	0.25	12.75 14.75	*0.75 1.25	13.25	*8.25 1.75	13.75 15.75	*1.50 0.50					*0.75				
ittsburgh NI	6.75 6.75 6.75	*7.0 *7.0	10.75 10.75	*3.0 *3.0 *3.0	13.75 13.75	1.50	14.25 14.25 14.25		14.75	1.25	15.25 15.25	1.75	15.75 15.75	0.50		*****		*****					
Youngstown Y1	6.75 5.75 6.75	*8.0	9.75	*3.0 *4.0 *3.0	12.75	0.50	13.25	*0.75	13.75	8.25	15.25 14.25 15.25	0.75		*0.50				*19.0	*0.75			+11.	

¹ Threads only, buttweld and seamless, 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on sinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in sinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1½, 1½ and 2-in., 2½ and 3-in., ptp., e.g., sinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; sinc price in range over 7¢ to 9¢ would increase discounts.

East St. Louis sinc price now 11.06¢ per lb.

TOOL STEEL

F.o.b	. mill					
W	Cr	V	Mo	Co	per lb	SAE
18	4	1	edem	-	\$1.84	T-1
18	4	1	-	5	2.545	T-4
18	4	2	_	-	2.005	T-2
1.5	4	1.5	8		1.20	M-1
6	4	3	6	***	1.59	M-3
6	4	2	5	-	1.345	M-2
High-	-carbo	n chr	omiu	m.,	.955 D	-3, D-5
Oil h	ardene	d ma	ngan	ese	.505	0-2
Speci	al car	rbon			.38	W-1
Extra	a carl	on .			.38	W-1
Regu	lar ca	arbon			.325	W-1
Wa	rehou	se pr	ices o	n and	east of	Missis-
	are 4					of Mis-

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

C	LAD STE	EL	Base pri	ces, cent	per lb f.o.b
		Plate (L4, C4,	43, J2)	Sheet (12)
-	Cladding	10 pct	15 pct	20 pct	20 pct
	302			,	37.50
	304	28.80	31.55	34.30	40.00
ype	316	42.20	46.25	50.25	58.75
Stainless Type	321	34.50	37.75	41.05	47.25
lainle	347	40.80	44.65	48.55	57.00
Ü	405	24.60	26.90	29.25	
	410	22.70	24.85	27.00	*****
	430	23.45	25.65	27.90	

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb		No. 1 Std.		Light Rails		Joint Bars			Track Spikes			Tie Plates			Track Boits		
Bessemer UI	S.	75	6	. 7	725	7	2	5									
Cleveland R3																	
So. Chicago R3			П						16	. 1	10	1					
Ensley T2	S	75	6	1	125												
Fairfield T2	2.		6	1	125			0.0	10	i	0	6	8	75			
Gary UI	5.	75	-	• •							-	6	8	75	*		* *
Ind. Harbor 13	-		1						10	i			-				
Ind. Harber /3 Johnstown B3			Ġ	1	125						-				*	* *	
Joliet UI	١					7.	. 2	5		0							
Kansas City S2 Lackawanna B3	1.		I.			1		-	10	.1	10				1	Š.	35
Lackawanna B3	5.	75	6		725	7	2	5									
Lebanon B3	1		1			7	. 2	5	100			1			à	5.	35
Minnequa C6	5	75	2	1	225	7	2	5	16	1	ia	ė	8	75	ñ	5	35
Pittsburgh P5	1		ľ	•••		1	-	-	100			1			ı	Ä	75
Pittsburgh 13	1.		Ľ						16	i	10				ľ	-	
Seattle B2			I.	•								ė	7	5	i	s.	85
Seattle B2 Steelton B3	15	75	1.	•		7	2	5	1.			6	2	75	١.		
Struthers Y1	-		1				•	-	34	i	10	-			1		
Torrance C7	1		1			1			100			6	7	5	1		
Williamsport S5	1		É	Û	725		* *		1.		* *	ľ		-	1.	* '	
Youngstown R3	1.		1		1 20 10	1			180		10	1.			1.	0 1	

COKE

Furnace, beehive (f.o.b.)	
Connellsville, Pa\$14.50 t	0 \$15.5
Foundry, beehive (f.o.b.)	\$18.5
Foundry oven coke	
Buffalo, del'd	. \$33.2
Detroit f.o.b.	32 0
New England, del'd	. 33.5
New Haven, f.o.b.	. 31.0
Formor M I fob	91.0
Kearney, N. J., f.o.b.	31.2
Philadelphia, f.o.b.	31.0
Swedeland, Pa., f.o.b	31.0
Painesville, Ohio, f.o.b.	34.3
Erie, Pa., f.o.b.	32.0
Cleveland, del'd	34.1
Cincinnati, del'd	. 32.8
St. Paul, f.o.b.	. 31.2
St Louis Cob	220
St. Louis, f.o.b.	33.0
Birmingham, f.o.b.	30.3
Milwaukee, f.o.b.	32.0
Neville Is., Pa	30.7

LAKE SUPERIOR ORES

51.50% F	'e nati	iral	C	2111	en	t,	-	lelivered
lower Lak								
Freight 6	changes	101		86	lle	p'8		
Onenhannt	la Transport							ross Ton
Openheart Old range								
Old range								
Mesabi, be								
Mesabi, no								
High phos								

ELECTRICAL SHEETS

22-Gage	Hot-Rolled	Coiled or Cut Length						
F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed					
Field	41.744	9.875	11.70					
Armature	11.70	11.20	12.40					
Elect	12.40	12,475						
Motor	13.55	13.05	13.55					
Dynamo	14.65	14.15	14.65					
Trans. 72	15.70	15.20	15.70					
Trans. 65	16.30							
		Grain (Oriented					
Trans. 58	16.80	Trans. 80.	19.70					
Trans. 52	17.85	Trans. 73.						

Producing points: Aliquippa (J3); Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (J3); Mansfield (E2); Newport, Ky. (A9); Nilea, O. (S1); Vandergrift (U1); Warren, O. (R3); Zaneaville, Butler (A7).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

(GRAPHITE		CARBON*							
Diam. (In.)	Length (in.)	Price	Diam. (In.)	Length (in.)	Price					
24 20 18 14 12 10 10 7 6 4 3	84 72 72 72 72 72 60 48 60 60 40	27.25 26.50 27.50 27.25 28.25 29.50 30.00 29.75 33.25 37.00 39.25	40 35 30 24 20 17 14 10 8	100, 110 110 110 72 90 72 72 72 60 60	12.50 11.20 11.70 11.95 11.55 12.10 12.55 13.80 14.25					
21/2	38	41.50 64.00								

• Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick Carloads per 1000 Super duty, Mo., Pa., Md., Ky.... \$185.00

High duty (except Salina, Pa.	
add \$5.00)	
Medium duty	125.00
Low duty (except Salina, Pa.	
Low duty (except Saima, Fa.	103.00
add \$2.00)	
Ground fire clay, net ton, bulk	22.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala	\$158.00
Childs Have Later De	100.00
Childs, Hays, Latrobe, Pa	
Chicago District	
Western Utah	183.00
California	. 165.00
Super Duty	
Hays, Pa., Athens, Tex., Win	d.
ham Warren O Marriagi	

ham, Warren, O., Morrisville	
163.00-	168.00
Silica cement, net ton, bulk, Latrobe	
Silica cement, net ton, bulk, Chi-	26.75
Silica cement, net ton, bulk, Ens- ley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif	39.00
Chrome Brick Per no	et ton
Standard chemically handed Rolt &	100 00

Standard	chen	nie	28	ul	13	7	1	36	01	n	d	e	d.		(3	u	r	-	-		-
iner, (Calif.				0	a						0		0					0	1	19	.00
Burned,	Balt.			0	9	0	0									0				1	03	.00
Magnesi	te Br	ic	k																			
Standard	l, Bal	ti	m	0	P	8				0		0				0				\$1	40	.00

Standa Chemic	rd, F	laltim bonde	ore . d, Ba	ltim	ore		140.00 119.00
Grain	Mag	nesite	St.	96	to	14-in.	grains
Domes	tic. f.	o.b. I	Baltim	оге	in	bulk.	
Luni	ng. N	lev.					
in b	ulk						46.00

in	sacks					52	.00-54.00
Dead	Burn	ed I	Dol	omit		Per	net ton
F.o.b	bulk,	pro	odu	cing	points	in:	\$16.75
Mis	souri	Val	ley				15.60
JM 10	iwest						17.00

(Effective March 30, 1959)

MERCHANT WIRE PRODUCTS

	Standard Q Coated Nails	Weven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Fairfield, Ala. 72 Galveston D4	173 175 175 177 177 173 173 173 9 . 101	190 192 187 187	172	214 212 212 214 212 212 212 212	190 198 198 196 198 193 193 193	9.00 8.75 9.10 9.00 9.00 9.00 9.10 9.00 9.00	9.775 9.55 9.55 9.55
Houston S2 Jacksonville M4 Johnstown B3** Joliet, III. A5 Kekemo C9 L Angeles B2*** Kansan City S2** Minnequa C6 Moneasen P6 Palmer, Mass. W6 Pittaburg, Cal. C7 Rankin, Pa. A5 S. Chicago R3 S. San Fran. C6 Sparrowa Pt. B3** Struthers, O. Y1**	184-1 173 173 175 178 178 178 192 173 173	190 187 189 192 192 210 187 187		219 212 214 217 217 217 236 214	198* 198† 193 213 193 193	9.10 9.00 9.00 9.10 9.95 9.25 9.25 9.60 9.60 9.60 9.95	9.775 9.675 9.65 9.65 10.625 9.80† 9.325 9.85° 10.15 9.25 9.20

* Zinc less than .10¢. *** .10¢ zinc.

** 11-12¢ zinc. † Plus zinc extras.

‡ Wholesalers only.

C-R SPRING STEEL

		CARBON CONTENT						
		0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06-			
Anderson, Ind. G4			12.60	15.60	18.59			
Baltimore, Md. 78			12,90	15.90	18.85			
Bristol, Conn. W12			12,90	16.10	19.30			
Boston T8			12.90	15.90	18.85			
Buffalo, N. Y. R7			12.60	15.60	18.55			
Carnegie, Pa. S9			12.60	15.60	18.5			
Cleveland A5			12.60	15.60	18.5			
Dearborn S1			12.70	******				
Detroit D1			12.70	15.70				
Detroit D2			12.70		*****			
Dover, O. G4			12.60	15.60	18.5			
Evanston, III. M8			12.60	******				
Franklin Park, Ill. 78		10.40	12.60	15.60	18.5			
Harrison, N. J. C//			12.90	16.10	19.3			
Indianapolis R5			12.60	15.60	18.5			
Los Angeles C1			14.80	17.80				
New Britain, Conn. S.			12.90	15.90	18.8			
New Castle, Pa. B4.			12.60	15.60				
New Haven, Conn. D	7. 9.40	10.70	12.90	15.90				
Pawtucket, R. I. N7.	9.50	10.70	12.90	15.90	18.8			
Riverdale, Ill. Ai	9.05	10.40	12.60	15, 60	18.5			
Sharon, Pa. Sl	8.9	10.40	12.60	15.60	18.5			
Trenton, R4		10.70	12.90	16.10	19.3			
Wallingford W1	9.46	10.70	12.90	15.90	18.5			
Warren, Ohio T4	8.95	10.46	12.60	15.60	18.7			
Worcester, Mass. A5		10.70	12.90	15.90	18.8			
Youngstown R5			12.60		18.5			

BOILER TUBES

\$ per 100 ft, carload lots	S	ize	Sean	nlega	Elec. Weld
cut 10 to 24 ft. F.o.b. Mill	OD- In.	B.W.	H.R.	C.D.	H.R.
Bahcock & Wilcox	2 21/2 3 31/2 4	13 12 12 11 10	40.28 54.23 62.62 73.11 97.06	63.57 73.40	35.22 47.43 54.77 63.93 85.53
National Tube	2 21/2 3 31/2 4	13 12 12 12 11 10	40.28 54.23 62.62 73.11 97.08	63.57 73.40	35.22 47.43 54.77 63.93 86.53
Pittaburgh Steel	2 21/2 3 31/2	13 12 12 11 11	40.28 54.23 62.62 73.11 97.08	63.57 73.40	

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders		
Electrolytic, imported, f.o.b		34.50 11.25 11.25
Carbonyl	-	88.00
Welding Powders*		8.10

Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10
Precipitated	
Manganese, f.o.b	\$5.00 19.00 42.00 \$3.95 \$1.03 53.50
Solder	value \$1.07 \$1.26 value value
Tungsten\$3.15 (nom	inal)

[.] F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Bolts	1-4 Con- tainers	5 Con- tainers	20,000 Lb.	40,000 Lb.
Machine				
3" and smaller x 3" and shorter 3" diam. x 3" and	55	57	61	62
shorter	47	4934	54	55
%" thru 1" diam x 6" and shorter %" thru 1" diam. longer than 6" and	87	3914	45	46
1½" and larger x all lengths Rolled thread, ½"	31	34	40	41
and smaller x 3" and shorter Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and	55	57	61	62
shorter	48	503-5	55	56

Note:	Add	25 pct	for	less than	container	quantity.	
						- 4	

Nuts, Hex, HP reg. & hvy. Full	case of
% in. or smaller	. 62
C. P. Hex, reg. & hvy. % in. or smaller % in. to 1½ in. inclusive 1% in. and larger	. 56
Hot Galv. Hex Nuts (All Types) % in. and smaller	
Semi-finished Hex Nuts % in. or smaller % in. to 1½ in. inclusive 1% in. and larger (Add 25 pct for broken case of quantities)	. 56
Finished	

	Dago het tan in
1/2 in. and larger	***************************************
	Pot. Off List
7/16 in. and smaller	r
Cap Screws	Discount (Packages)
Full Fini New std. hex head,	shed H. C. Heat Treat
aged	Full Case

% in. and smaller 65

Base per 100 lb

%" diam. and smaller x		
6" and shorter	54	42
%", %", and 1" diam. x	38	23
%" diam. and smaller x longer than 6"		
%", %", and 1" diam. x longer than 6"		1018 Ste
		l-Finish

%" through %" dia. x 6"	Ca	rtons Bul	k
and shorter	59	48	
%" through 1" dia. x 6" and shorter	45	32	64

Minimum quantity—¼" through %" diam., 15,000 pieces; 7/16" through %" diam., 5,000 pieces; %" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

		Disco	
Plain Finisi	1	Mach. Screws	Stove
Cartons		60	60
	Quantity		
To ¼" diam. incl.	25,000-and ove	r 60	4 4
5/16 to ½" diam. incl.	15,000-200,000	60	0.0

Machine Screws & Stove Bolt Nuts

		Discount				
In Cartons	Quantity	Hex 16	Square 19			
In Bulk %" diam. & smaller	25,000-and over	15	16			

ELECTROPLATING SUPPLIES

Anodes (Cents per lb. frt allowed in quantity)

PIC

Dill silidow ma 0.5 (Gi Ke Ad to ma pet

(Cents per 10, /rt anotted in quantity)
Copper
Rolled elliptical, 18 in. or longer, 5000 lb lots
Brass, 80-20, ball anodes, 2000 lb
or more 47.50
Zinc, ball anodes, 2000 lb lots 18.00 (for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carton,
5000 lb
(Rolled depolarized add 3¢ per lb)
Cadmium
Chemicals .

(Cents per lb, f.o.b. shipping	poin	(1)
Copper cyanide, 100 lb drum		65.90
Copper sulphate, 100 lb bags,	per	
cwt.	0 0 0	22.75
Nickel salts, single, 100 lb bags.		36.00
Nickel chloride, freight allowed,		45 00
Sodium cyanide, domestic, f.o.b.		40.00
N. Y., 200 lb drums		99 70
N. 1., 200 ID drums		60.10

N. Y., 200 lb drums 23.70 Chiladelphia price 24.00) Zinc cyanide, 100 lb 60.75 Potassium cyanide, 100 lb drum N. Y. 45.50 Chromic acid, flake type, 10,000 lb or more 30.44

CAST IRON WATER PIPE INDEX

Birming	har	n	0		0				0	0	0	0					0			0			125.8
New Yo	rk																						138.5
Chicago																	0	0	0	0	0		140.9
San Fra	anel	SC	0	-I	6.		À						0						0				148.6
Dec.	195	5.	1	va	ll	4	e,		1	C	le	3.0	9.8	8		B			91	P		he	eavier
5 in. or	lar	ge	29"		be	el	ı	-	a	98	d		8	p	ij	g	0	t	3	91	8	ie.	Ex-
planatio																							
Source:	77.	8		P	(2)	e		a	93	d	t	ě	10	91	14	181	d	r	14	1	Ċ	0.	

CTEEL CERVICE OFNITERS

M.f. strong Cton	Price, dollars pe	100 IL

		es	1	Strip Plate	Di.	61	Bar	. 1	Alloy Bars				
Cities		Sheets		Strip	Plates	Shaper	Bat	18		Alloy			
City Delivery t Charge	Het-Rolled (18 ga. & her.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Structural	Hot-Relled (merchant)	Cold. Finished	Hot-Rohed 4615 As rolled	Hot-Rolled 4148 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn	
Atlanta	8.50	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	11.17.11		1146161		
Baltimore \$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.00	
Birmingham	8.18	9.45	10.46	8.51	8.89	9.00	8.99						
Bostom	9.41	10.50	12.07	9.84	10.12	10.11	10.21	13.45*	16.79	15.79	28.29	19.56	
Buffalo	8.40	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30	
Chicago	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95	
Cincinnati15	8.58	9.65	10.70	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27	
Cleveland 15	8.51	9.69	11.51	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.00	
Denver	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84	
Detroit	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23	
Houston	8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95	
Kansas City 15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62	
Los Angeles	8.70	11.20-	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60	
Memphis	8.55	9.80		8,60	8.93	9.01	8.97	12.11*		******		****	
Milwaukee 15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.00	
New York 10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.3	
Norfolk 20	8.20			8.90	8.65	9.20	8.90	10.70					
Philadelphia 10	8.30	9.35	10.44	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.3	
Pittsburgh15	8.50-		11.05	8.76	9.05	9.15	9.14	11.40*	16.29	15.20	19.70	18.9	
Portland	8.60 10.00 ¹	9.95 11.75 ²	13.303	11.954	11.50	11.106	9.857	15.30*	18.50	17.45	20.75	20.2	
San Francisco10	9.75	11.200	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.6	
Seattle	9.95	11.55	12.45	10.00	9.70	9.80	10.10	14.70	17.15	16.80	29.65	29.6	
Spekane	10.10	11.70	12.60	10.65	9.85	9.95	10.75	14.85	17.75	16.95	21.55	20.7	
St. Louis 15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.3	
St. Paul	8.94	10.19	11.64	8.99	9.45	9.53	9.707	10.16		15.41		19.2	

Base Quantities (Standard unless otherwise keyed); Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. "*All sizes except 18 and 16 gage.

†† 10¢ xinc. \$\frac{1}{2}\text{Deduct for country delivery.} \text{*C1018--1 in. rounds.} \text{*10 ga. x } 36" x \text{*120"}; \text{*25 ga. x } 30" x \text{*96"}; \text{*4\subseteq x } 1" in lots of 1000 to 9999; \text{*3 kared plate } \text{*4\subseteq x } 1" in lots of 1000 to 9999; \text{*5 sheared plate } \text{*4\subseteq x } 1" in lots of 1000 to 9999; \text{*6 lb ga. & heavier; *14 ga. & lighter.}

Producing Point	Basic	Fdry.	Mall.	Boss.	Low Phos.
tirdsboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R3	62.00	62.50°		*** ***	*****
Birmingham W9 Birmingham U4	62.00	62.50°	66.50		
Birmingham U4	62.00	62.50°	66.50	******	
Buffalo R3	66.00	66.50	67.00	67.50	
Buffalo HI	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago 14	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth 14	66.00	66,50	66,50	67.00	71.00
Erie 14	66.00	66.50	66.50	67.00	71.00
Everett M6	67.50	68.00	68.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2.	67.90	68.40	68.90		
Hubbard Y1			66,50		
Ironton, Utah C7.	66.00	66.50			
Midland C//	66.00				
Minnegua C6	68.00	68.50	69.00		
Monassen P6	66.00				
Naville Is. P4	66.00	66.50	66.50	67.00	71.00
N. Tonawanda TI		66.50	67.00	67.50	11.00
Sharpaville S3	66.00		66.50	67.00	
So. Chicago R3	66.60	66.50	66.50	67.00	
Sa. Chicago W8	66.00		66.50	67.00	*****
Swedeland 42.	68.00	68.50	69.00	69.50	*****
Tolodo 14	66-00	66.50	66.50	67.00	*****
Troy, N. Y. R3	68.00	68.50	69.00	69.50	77 00
Youngatown Y/	40.99	40.30	66.50	99.30	73.00
Toungstown 77			89.00		*****

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct ailicon or portion thereof over hase (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 32 per ton for 0.50 to 0.75 pct nickel, 51 for each additional 0.25 pct nickel, Add 51.00 for 0.31-0.95 pct phos.

Silvery Iron: Buffalo (6 pct), HI, 379.25; Jackson JI, 14 (Globe Div.), 378.00; Nisgara Falls (15.01-15.50), 3101.00; Keckuk (14.01-14.50), 1510.50; (15.51-16.60), 3106.50. Add 31.00 per ton for each 0.50 pct allicon over hase (6.01 to 5.00 pct) up to 18 pct. Add 31.25 for each 0.50 pct mananese over 1.00 pct. Beasemer silvery pig iron (under 1.10 pct phes.); 364.00. Add 31.00 premium for all grades silvery to 18 pct.

† Intermediate low phos

Product	201	202	301	302	383	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	-	28.00	41.25	33.50	38.50	-	17.50	-	17.78
Slabs, billets	28.80	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	-	22.25	-	22.56
Billets, forging	-	37.75	38.75	39.50	42.50	42.00	64.50	48.75	\$7.75	29.25	29.25	29.75	29.71
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.54
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	49.75
Strip, hot-rolled	36.00	39.00	37.25	49.50	-	44.25	69.25	53.50	63.50	-	31.00	-	32.00
trip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	89.75	65.50	79.25	49.25	40.25	42.50	49.73
Vire CF: Red HR	_	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., CII; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., UI; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A2; Massillon, O., R3; Gary, UI; Bridgeville, Pa., U2; New Castle, Ind., I2; Detroit, M2; Louisville, O., R5.

Strip: Midland, Pa., Cl1; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Detroit, S1; Canton, Massillon, O., K3; Harrison, N. J., D3; Youngstown, R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus their conversion extras); W1 (25¢ per lb, higher); Seymour, Conn., S13, (25¢ per lb, higher); New Bedford, Masa, R6; Cary, U1, (25¢ per lb, higher)

Bar: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., 12; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R5; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3, R3; Ft. Wayne, 14; Detroit, R5; Gary, U1; Owemboro, Ky., G5; Bridgeport, Conn., NA

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Newark, N. J. D2; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2; Detroit, R5.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Baltimore, E1; Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., 12; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8.

(Effective March 30, 1959)





over Mishor Seller 8. 187 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

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FERROALLOY PRICES

FERROALLOY PRICES		
Ferrochrome Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si. 0.02% C41.00 0.50% C38.00 0.05% C39.00 1.00% C37.75 0.10% C38.50 1.50% C37.55 0.20% C38.25 2.00% C37.25 4.00-4.50% C, 60-70% Cr, 1-2% Sl28.75 2.50-5.00% C, 57-64% Cr, 2.00-4.50% Sl28.75 81 28.25 0.025% C (Simplex) .36.75 8% max C, 50-55% Cr, 6% max Si. 25.75 4%% max C, 50-55% Cr, 2% max Si 26.50 High Nitrogen Ferrochrome Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Chromium Metal Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max Kr, 1% m	Spiegeleisen	Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb. Carloads, bulk 9.85¢ Ton lots 11.20¢ Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo \$1.50 Ferroccolumbium, 50-60% lb, 2 in x D, delivered per pound contained Cb. 50 lb. 200 less ton lots 33.95 Ferrotantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta \$3.40 Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo. \$1.76 Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, \$10.00
0.10% max. C. \$1.29 9 to 11% C, 88-91% Cr, 0.75% Fe. 1.38 Electrolytic Chromium Metal Per lb of metal 2" x D plate (%" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max. \$1.15 Ton lots	Medium Carbon Ferromanganese Mn 80 to 85%, C 1.25 to 1.50, SI 1.50% max. carloads, lump, bulk, delivered, per lb of contained Mn	per gross ton
Carloads, bulk 22.25 14.60	0.30% max. C	Ferrotungsten, ¾ x down packed, per pounds contained W, ton lots delivered \$2.15 (nominal) Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. \$1.49 bags, f.o.b. Washington, Pa., Langeloth, Pa. \$1.38 Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb. Carload, bulk lump 18.50¢
packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads, bulk	Carloads, bulk, delivered, per lb of briquet Briquets, packed pallets, 3000 lb up to carloads	Vanadium exide, 86-89% V ₂ O ₈ per pound contained V ₂ O ₈
V Foundry Alloy Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed. Carload lots 18.45 Ton lots 19.95 Less ton lots 21.20 Graphidox No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. Carload packed 19.20 Ton lots to carload packed 21.15 Less ton lots 22.40	Cents per pound contained SI, lump size, delivered, packed. 98.25% SI, 0.50% Fe. 24.95 23.65 98% SI, 1.0% Fe . 24.45 23.15 Silicon Briquets Cents per pound of briquets, bulk, delivered, 40% SI, 2 lb SI, briquets. Carloads, bulk 8.00 Ton lots, packed	Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B 2000 lb carload
Ferromanganese Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Producing Point per-lb Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. 12.25 Johnstown, Pa. 12.25 Neville Island, Pa. 12.25 Sheridan, Pa. 12.25 Philo, Ohlo 12.25 Sheridan, Pa. 12.25 Add or substract 0.1¢ for each 1 pct Mn above or below base content. Briquets, delivered, 66 pct Mn: Carloads, bulk 14.30 Ton lots packed in bags 17.20	50% Si 14.60 75% Si 16.90 65% Si 15.75 85% Si 18.60 90% Si 20.00 Ferrovandium 50-55% V delivered, per pound, contained V, in any quantity. Openhearth 2.20 Crucible 3.30 High speed steel 3.40 Calcium Metal Eastern zone, cents per pound of metal, delivered. Cast Turnings Distilled Ton lots 2.05 \$2.95 \$3.75 100 to 1999 lb. 2.40 3.30 4.55	N. Y., delivered 100 lb up 10 to 14% B
134	(Effective March 30, 1959)	THE IRON AGE, April 2, 1959

A painter prompted a new look





When one of our maintenance department painters was redecorating the treasurer's office, he asked about U.S. Savings Bonds. "If I could buy these Bonds on installments," he said, "and you could take my payments out before I got my paycheck, I'd hardly miss it."

Our treasurer explained that the Payroll Savings Plan does exactly that and gave the painter an application card. But the matter didn't end there, for our painter had given *us* something, too: an idea that helped to put real color into our plan.

He made us realize that if he was unfamiliar with this plan, many others must be in exactly the same position.

Our State Savings Bond Director helped us pass the word. Under his direction, we set up a company-wide campaign that gave the whole Payroll Savings story to every person in the Company. Within a few days we had the best employee participation we've had since the mid-forties.

People are quick to take advantage of this sound, automatic way to save money. Today there are more payroll savers than ever before in peacetime. Look up your State Director in the phone book or write: Savings Bonds Division, U.S. Treasury Department, Washington, D.C.



The IRON AGE



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- (1) 2200 H.P. Westinghouse motor, 600 V.D.C., 92/132 R.P.M.
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- (3) 3500 K.W., Allis Chalmers Motor Generator sets, 350/700 V.D.C. with 5000 H.P., 13800/6900 V motor & control
- (1) 1875 K.W., Whse. motor generator set 250 V.D.C., with 2700 H.P., motor 13800/6900 V and control
- (1) 1250 K.V.A. Whse. Hi-Cycle Frequency Set, 800 V., 960 cycle, with 1875 H.P., 2300 V., syn motor complete with all switch gear

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THE CLEARING HOUSE

Pittsburgh Sales Gain Lacks Boom Quality

Used machinery dealers in the Pittsburgh area are pleased by an upturn in sales, although soft spots still exist.

All portions of the market, except electrical goods, are improved.

 Most Pittsburgh used machinery dealers report a sales upturn. The improvement is not a boom. There are some soft spots and nowhere is there an overpowering push to buy. But for the most part both inquiries and orders have climbed since the start of the year.

"We're a lot happier now than we were last year," says one supplier of steel mill equipment. "Business is still kind of scrawny. The emphasis is on auxiliary equipment. But we are busier."

Meeting Their Needs-One of the problems, as he sees it, is a lack of tempting equipment. "It doesn't matter how many inquiries you get if you don't have what people want."

Another dealer in the steel mill line calls the supply "pretty fair." Inquiries are up sharply for this dealer. "We have more than we can handle." Pricing is called reason-

Electrical Goods Slump—In sharp contrast with this picture, a supplier of electrical equipment reports a complete collapse in business during the past month. This decline is puzzling and alarming because order volume in the electrical field generally follows steel activity.

Last year sales of electrical equipment held up well in the early

months of the general slump. They sagged toward the end of the first half, then began moving upward with the steel recovery in the second. The improvement continued through the end of the year and into the first two months of 1959.

DR

Why a Falloff?-In March electrical orders fell off abruptly. The drop came as steel production was moving toward record heights. The dealer concerned is baffled by the switch. He can only explain the order cutoff as the result of general uncertainty. Steel mills are not yet going ahead with long range expansion plans. They are not building big inventories. They are operating on a close-to-the-vest daily basis.

Spotty Upturn — This sentiment carries through to other lines. Inquiries for machine tools are up and there is more buying. But the upturn is spotty. Improved business is forcing plants to order machines. The boom has not sold itself to the extent that customers are anticipating future needs and launching big programs.

The supply of machine tools is called good for current demand. Dealers find themselves competing with other sources for available orders. Prices are being held down. It is still a buyers market.

Demand for presses, brakes, and other fabricating lines shows little

Suppliers of material handling equipment follow the general pattern for the district. Orders are up a little. Inquiries are up sharply. Main interest centers on conveyors and production cranes.

GOOD USED EQUIPMENT CONSIDER

BENDING ROLLS

10' x 10 Ga. Bertach No. 6 Initial Type

12 x %" Hilles & Jones Pyramid Type 10' x 10 Ga. Bertsch No. 6 Initial Type
12 x %' Hilles & Jones Pyramid Type
12 x %' Hilles & Jones Pyramid Type
14' x 13',16" Bettsch Initial Type
32' x %'' BALDWIN PYRAMID TYPE—LATE
BRAKE—LAFT TYPE
12' x ½'' Dreis & Krump

BRAKES—PRESS TYPE

12' x 5/32" 8-W Press Brake

500 ton Pacific 12' Bending Length, Hydraulic

CRANES—OVERHEAD ELECTRIC TRAVELING 8 ton P&H 55' Span 230/3/60 10 ton Shaw 10 ton Whiting 16 ton Shaw 15 ton N-B-P 30 ton SShaw 120 ton Niles

DRAW BENCHES DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw
FORGING MACHINES
1" to 5" Acme, Ajax, National

1" to 5" Acme, Ajax, National
GEAR REDUCERS
3000 H. P. United (2), Ratio 16.2-1 & 11.6-1
HAMMERS—BOARD DROP—STEAM DROP—STEAM
FORGING
800 lb. to 12,000 lb. incl.
LEVELERS—ROLLER
13" Waterbury Farrel 9 Rolls 6" Dia.
24" McKay 17 Rolls 2% Dia.
56" Processor & Leveler, Capacity 59" x .109"
66" Guide 17 Rolls 4%" Dia.
23" Leveler 17 Rolls 2%" Backed Up

MOTOR 800 H.P. Westinghouse 2200/3/60 505 RPM

MULTI SLIDE MACHINE
No. 35 U.S. Multi-Slide, Max. Capy. 44" wide x .089
NIBBLER
Pullmax Model 2, Capacity 11/32"

PRESS-EMBOSSING & COINING #664 Toledo 600 ton, 2" Stroke

RESSES—STRAIGHT SIDE 190 ton Toledow 257%, Bed Area 29x29", Stroke 10" 215 ton Clearing, Bed Area 39x42", Stroke 24" 290 ton Cleveland #TF, Bed 42 x 84", Stroke 12", 500 ton Hamilton #18104, Area 19x17½", Stroke 1½", 900 ton Hamilton #E-1849, Bed 101x181", stroke 30"

900 to Hamilton be-vertical, Triplex 4%x9", 1500 = Pressure, with 250 H. P. Motor 2300/3/60 PUNCH & SHEAR COMBINATIONS #1% Buffalo Universal Ironworker

EF Cleveland, ou Throat

70 Lino Mills

34" x7" 81x Roll Cluster Mill

10" x 14" 8ingle Stand Two High

10" x 16" 8ingle Stand Two High

10" Morgan Merchant Mill

12" x 16" 8ingle Stand Two High

16" x 24" Two Stand Two High

20" x 36" 8ingle Stand Two High

26" x 60" 8ingle Stand Two High

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These incomparable annealing results prove

OPENED COIL METHOD E

TABLE 1

SUMMARY PHYSICAL TESTS, METALLURGICAL TEST

SIZE: .0359" x 424" x 764"

PART: EXTERIOR DOOR PANEL

Weight 26,900

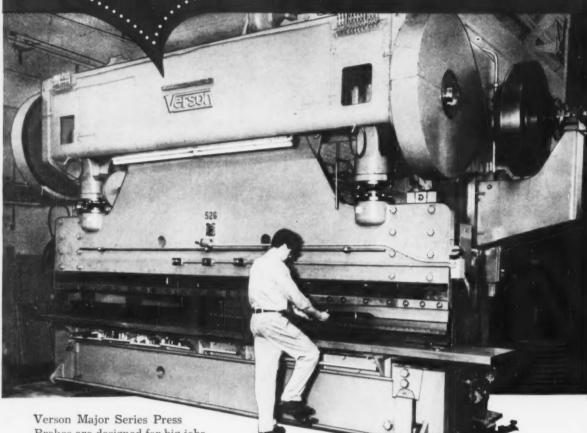
Al-Killed Steel

		Outside as Anneal			led		Center	ter	Inside as Annealed				
		1	2	3	4	5	6	7	8	9	10	Average	Range
		43	44	43	44	44	43	43	43	44	44	43.5	43/44
HARDNESS	C	44	42	42	43	44	43	43	44	44	43	43.2	42/44
	E ₂	43	42	44	44	44	42	42	44	45	44	43.4	42/45
OLSEN DUCTILITY	E1	415	415	420	420	420	420	420	415	415	415	417.5	415/420
	C	410	415	415	425	420	420	415	420	415	415	417.0	410/425
	E ₂	410	415	420	425	415	415	415	415	415	420	416.5	410/425
MICRO GRAIN SIZE	E ₁	6	6/7	6/7	6/7	7	7	7/8	7/8	7	7/8		
	C	6/7	6/7	6/7	6/7	7/8	7/8	7/8	7/8	7/8	7/8		
	E ₂	6/7	6/7	6	6/7	7/8	7/8	7	7	7	7		
Yld. Str. (psi)		L 27,540	T 27,78	0	L 26,4		T 27,010		L 26,750		T 27,780		
TENSILE RESULTS Tens. Str. (psi)		44,910	45,29	0	45,1	760	45,210		46,680		47,050		
% Elong.		40.0	39.0		40:0		38.0		39.0		39.0		



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